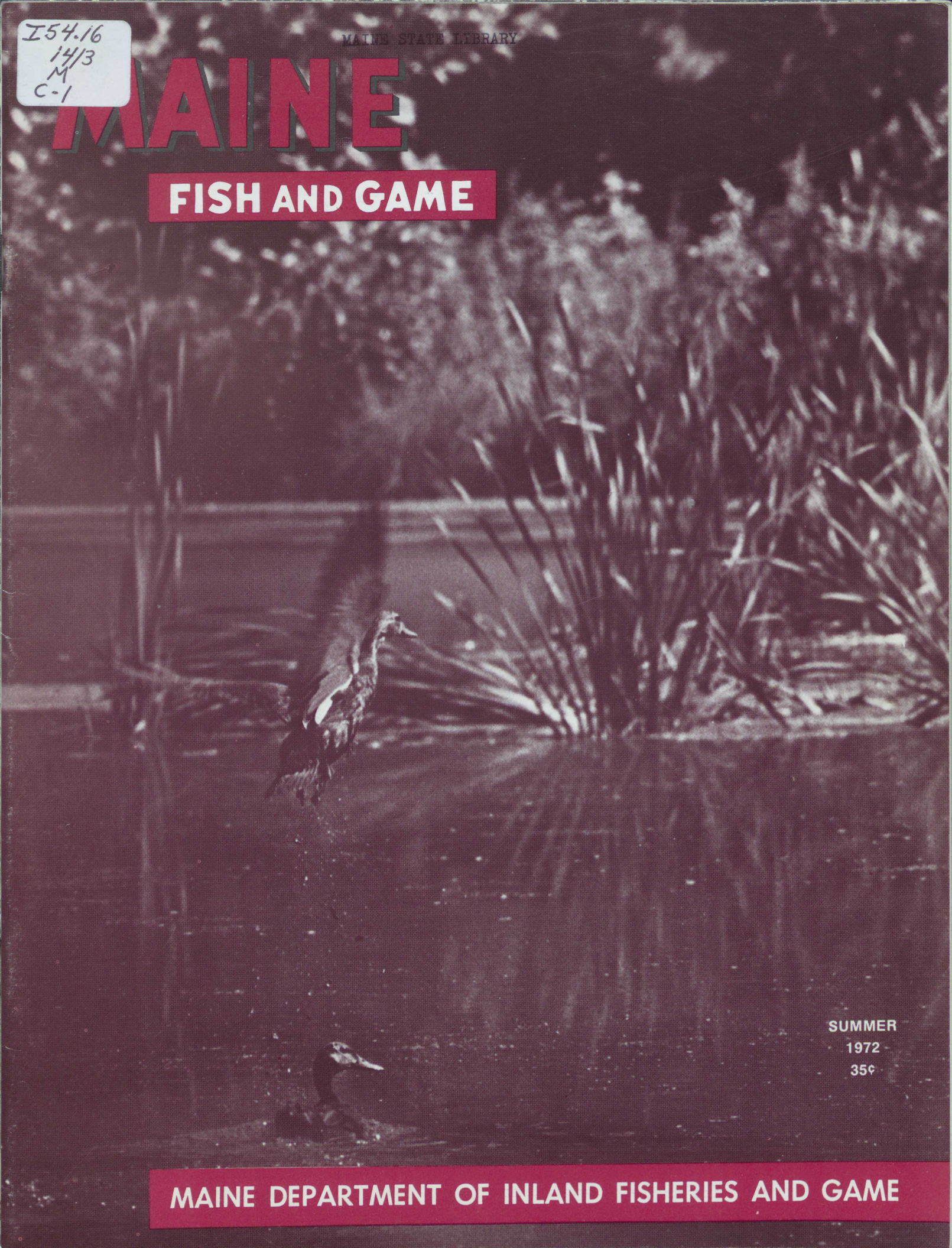
MAINE

FISH AND GAME



SUMMER
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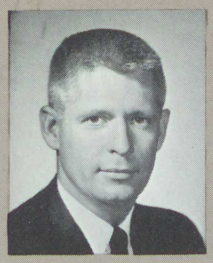
MAINE DEPARTMENT OF INLAND FISHERIES AND GAME



Governor
Kenneth M. Curtis

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MAINE FISH AND GAME

STATE OF MAINE

Summer, 1972 **Vol. XIV, No. 3**

THE COVERS

Front: If your approach is quiet and your camera fast, you might "freeze" the wary black duck in mid-takeoff as Photographer Bill Cross did on a recent visit to a Maine marsh.

Inside Front: A Fritillary-group butterfly taking nectar from a thistle flower. Photo by Bill Cross.

Inside Back: For pleasant scenery and good fishing, Maine's Sheepscot River is hard to beat. Photo by Tom Carbone.

Back: A foggy morning on a marsh. Photo by Bill Cross.

EDITORIAL

1972 DEER SEASONS

The 1972 deer seasons were announced by Commissioner Maynard F. Marsh July 6. In view of deer populations that still are lower than usual in some sections of Maine, he made certain adjustments in the previously announced season dates, under the provisions of a new law enacted by the 105th Legislature in 1971.

The decision was made with the objectives of distributing hunting pressure properly, providing hunting opportunities, and yet conserving our deer herd.

Attending a meeting at Greenville were members of the Commissioner's Advisory Council, the Legislature's Fisheries and Wildlife Committee, big game specialists of the Game Division, and warden supervisors. The Commissioner received reports from the field personnel and then held an executive session during which a thorough discussion resulted in his decision, which was approved by the Council.

By and large, the 1971-1972 winter was not too rough on our deer. And in the populated southern areas where dog-deer problems are ordinarily greatest, the relatively mild winter and light snow cover helped keep the number of deer killed by dogs to a relatively low level. It was apparent that increased public co-operation was of great value, too, as control of dogs is one of the most important factors in keeping the toll down.

The areas around Jackman and Greenville were restricted to the season dates assigned to the Southern Zone, as were some other sections across the state east of Moosehead Lake, and the firearms season in the Southern Zone was shortened by one day.

There was no shortening of the special archery season, which remains as established by the Legislature in 1971. As the law does not allow the Commissioner to lengthen a season, the archery season in the southern zone ends November 3, as previously scheduled.

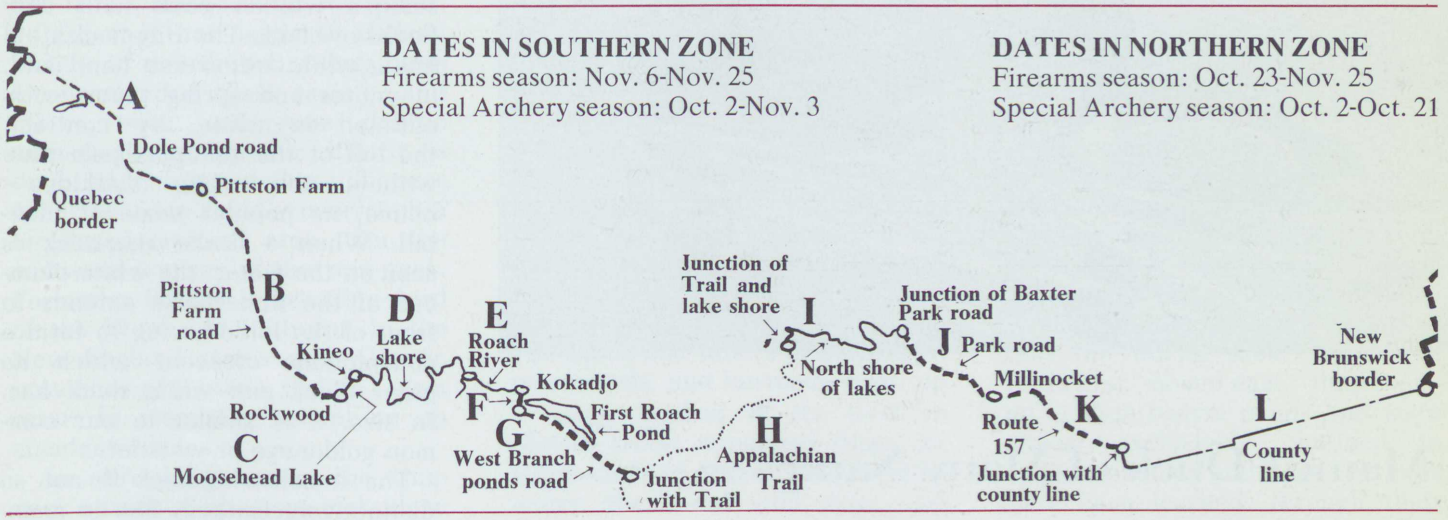
It should be noted that these seasons pertain only to 1972.

MAINE'S 1972 DEER HUNTING ZONES AND SEASONS

As promulgated July 6, 1972, by Commissioner Maynard F. Marsh

DATES IN SOUTHERN ZONE
Firearms season: Nov. 6-Nov. 25
Special Archery season: Oct. 2-Nov. 3

DATES IN NORTHERN ZONE
Firearms season: Oct. 23-Nov. 25
Special Archery season: Oct. 2-Oct. 21



A — Dole Pond road from the border (in T.5, R.20) to Pittston Farm.

B — Pittston Farm road to Rockwood.

C — Across Moosehead Lake to Kineo.

D — Shore of Moosehead Lake to Roach River.

E — Roach River to Kokadjo.

F — Greenville road to junction with West Branch ponds road, south of First Roach Pond.

G — West Branch ponds road to junction of Appalachian Trail at Second West Branch Pond.

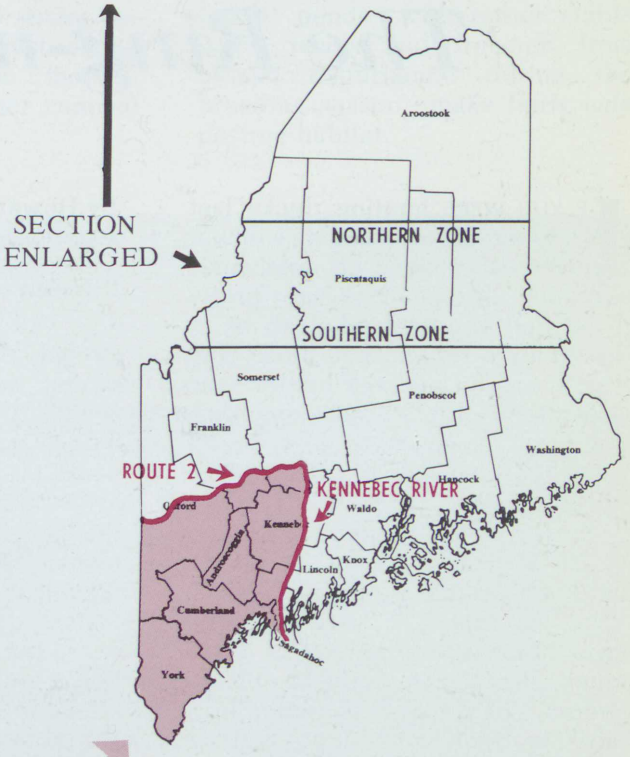
H — Appalachian Trail to the shore of Pemadumcook Lake.

I — North shores of Pemadumcook and Ambajejus lakes to junction with Baxter Park road.

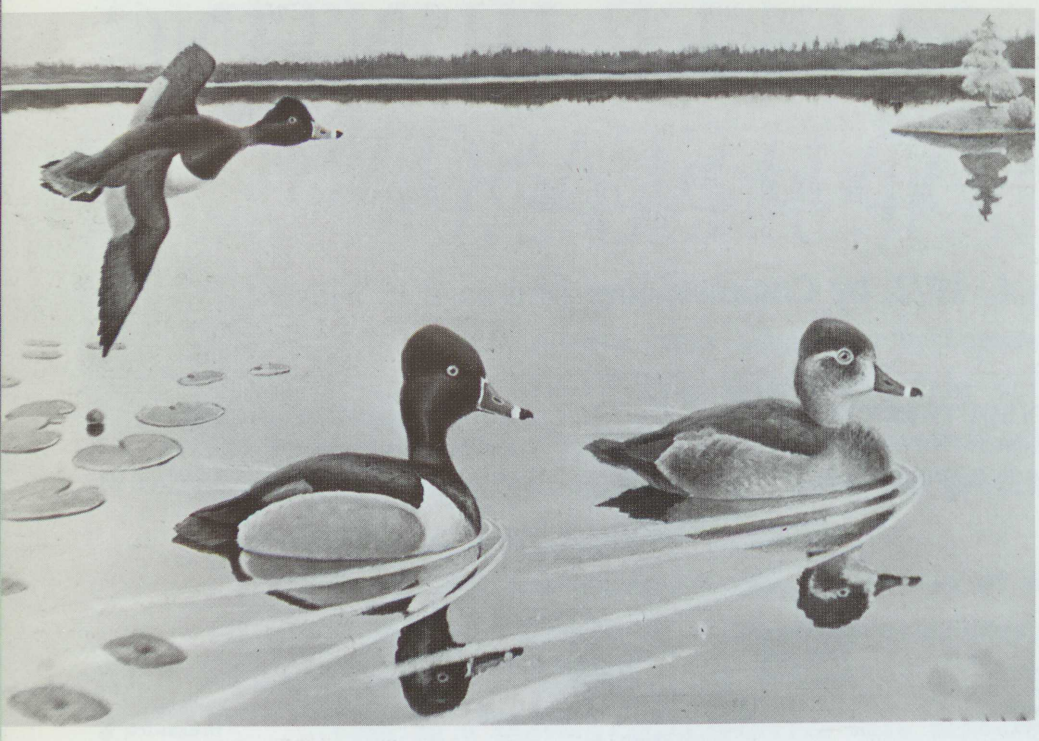
J — Baxter Park road to Millinocket.

K — Route 157 to junction with Aroostook County line.

L — County line east to New Brunswick border.



During the 1972 deer hunting season, anyone hunting with firearms in the area south of U.S. Route 2 and west of the Kennebec River, shall wear fluorescent, orange clothing which is visible from all sides — except when hunting waterfowl from a boat or blind.



Female (right) and male ring-necked ducks in spring plumage.
(From a painting by Ralph S. Palmer.)

Maine's Duck of Many Names —

The Ring-neck

By Howard L. Mendall, Leader
Maine Cooperative Wildlife
Research Unit
University of Maine at Orono

IF YOU WERE hunting ducks last October on one of Maine's inland marshes, ponds, or deadwater streams, the chances are pretty good that you shot, shot at, or at least saw a ring-necked duck. And if you are an average hunter who gets afield only a few times each fall, the chances are also pretty good that you didn't recognize the ring-neck as such.

To carry our "chances are" story a little further, your encounter with ring-necks could easily have gone like this: You were crouched in a blind with a spread of black duck decoys in front. But the blacks weren't flying well on this "bluebird" morning, and you got restless and inattentive. Maybe you started to open your lunch. Suddenly, there was a swishing rush of air behind you—half whistle and half roar, like jet planes in the distance. Six or eight medium-sized ducks swooped over your head, circled the decoys, flared, and swung out of range before you could get your gun to your shoulder.

That was likely a flock of ring-necked ducks, one of the speediest of waterfowl. This is the species that Allan Brooks, internationally famous bird artist and a student of flight speeds, rated as the second fastest duck in North America—exceeded only by the old squaw. Some Maine duck hunters are inclined to dispute Mr. Brooks. They would put the ring-neck first.

If you do not recognize this duck, you are not alone. Many hunters have difficulty in separating ring-necks from several other species, especially the lesser scaup or bluebill. The two ducks are similar in size, often occur on the same waterways, and have a rather close resemblance. Careful scrutiny, however, reveals several differences. The back of the male ring-neck is completely black, in contrast to the scaup's whitish back with only flecks of black. The ring-neck's bill has a white transverse band and, in winter and spring plumage, is outlined in white. By contrast, the bill of the scaup is pale blue without the white markings—hence, its popular name of bluebill. When a drake ring-neck is seen on the water, the white plumage of the underparts extends in front of the folded wing to form a conspicuous crescent which no other black and white duck has. In size, it is similar to our common goldeneye or whistler.

The female ring-neck is not so distinctively marked. She is mainly brownish-gray with mottled white underparts that become brown in summer. Her bill has the white, transverse stripe of the male, but it is less prominent. Both sexes have a gray wing patch, and when the bird is in flight, this will separate it from scaups or any other common, medium-sized duck in Maine.

The chestnut neck-ring of the male, which gave the duck its name, is seldom seen except when the bird is viewed under favorable light conditions. Thus, this is not an appropriately named duck. It would seen more logical to call it the ring-*billed* duck. In fact, over much of the northern part of its range, this *is* the name by which the bird is known to most sportsmen. But the ring-neck has many other popular names, depending on locality. Some of these are: marsh bluebill, little bluebill, ring-billed bluebill, marsh broadbill, little broadbill, ring-necked scaup, ring-billed scaup, moonbill, little raft duck, and blackhead. A name widely applied throughout the South is blackjack.

The female ring-neck is a rather noisy duck, especially during spring

and when she is disturbed with her young. Her call can best be described as a "purring-growl." The male is usually silent except during courtship display, when he utters a low, hissing whistle audible for only a short distance.

THE RING-NECKED DUCK is not a "native" of Maine, or anywhere else in the Northeast, for that matter. It is a comparative newcomer, a bird that has made a striking change in distribution. Many birds have extended their ranges, and others have undergone drastic numerical fluctuations. But it is doubtful that any of these changes occurred more rapidly over such a large geographical area than the eastward journey of the ring-neck. Formerly, it was a breeding bird of the West and Midwest. In the New England states and Atlantic provinces of Canada, it didn't even occur in migration except on an accidental basis.

An abrupt change in the ring-neck's summer quarters took place during the 1930's. The bird became increasingly common in the Northeast during migration. It was found breeding in Maine and Pennsylvania in 1936 and in New Brunswick the following year. Then, within a few years, came new nesting records for Nova Scotia, Prince Edward Island, Quebec, Newfoundland, eastern Ontario, New Hampshire, Vermont, New York, and Massachusetts.

Not all of these new breeding nuclei were successful, but many were, and the population increased and spread out still further. The duck is now well established as a breeder throughout much of the Northeast. It is the second most abundant inland nesting duck in Maine, outnumbered only by the black duck.

The ring-neck, a diving duck, obtains most of its food beneath the surface. It consumes more vegetable food than do most divers. The seeds and tubers of bulrushes, pondweeds, and burreeds make up a major portion of its food in Maine. Other important items include seeds of sedges, smartweeds, water lilies, and wild rice; also rootstalks, buds, and leaves of wild celery. The downy young depend heavily, as do most young waterfowl, on aquatic insects, small snails, and other animal foods rich in proteins.

Ring-necks are primarily birds of fresh-water marshes and are seldom seen on the coast. Although they are often found in tidal rivers and estuaries, it is usually in the fresh-water portions of such habitat. They are very partial to sedge-meadow marshes and bogs that are numerous in northern, eastern, and central Maine. This type of habitat commonly occurs in ponds, the coves of some of the large lakes, and, especially, thoroughfares between lakes. Sluggish woodland streams and reed-bordered deadwaters of rivers are likewise favorite environments.

During recent years, ring-necks in both Maine and New Brunswick have made increased use of beaver flowages for nesting. It is the largest and older beaver ponds—those with grass and sedge borders or with numerous sedge hummocks—that the ducks seek. When the birds first "moved east," they seemed to shun beaver ponds and were almost exclusively confined to sedge-meadows and bogs. Perhaps they have learned, through their association with black ducks, that beaver ponds—with rather stable water levels and freedom from human disturbance during the breeding season—make fairly safe nesting habitat.

This central Maine bog pond is typical ring-neck nesting habitat.

Photo by the author

Photos by the author

The canoe paddle marks the site of a ring-neck nest that was used for four consecutive years. A tunneled runway, shown by the arrow, led to the nest.

THIS DUCK is not a cold weather bird. Although it arrives in Maine from the wintering grounds of the southern states in April, the peak of migration may not be reached until the end of that month. Some black ducks are already nesting while ring-necks are still leisurely traveling northward.

Even after the birds have reached the breeding marshes, they seem to be in no hurry to set up housekeeping. Often, they linger for two or three weeks in loose flocks, in the open water of the breeding marshes or on a nearby river or lake, before individual pairs slip away from the group to select nest sites. This delayed nesting may be nature's way of insuring better hatching success. The ring-neck is very exacting in its nest site—it must be a fairly dry spot but as close as possible to swimable water. These requirements can best be met by waiting until well after the spring run-off when new marsh vegetation has appeared and when there is less danger of spring floods.

The nest site is selected by the female, but she is accompanied by her mate. At times, the preliminary selection is from the air, with the pair making low passes over the marsh. Always, whether by flying or swimming, these searches are by the female leading and the male following closely behind.

When breeding is successful, the birds invariably return to the same nesting area—often to the identical site. One nest on a floating island at Portage Lake was used for four consecutive seasons. At the state's Pennamaquan game management area, a bird live-trapped on her nest was first banded as a duckling two years before, only a hundred yards from where she was found nesting.

The nest may be in a tussock of grass or sedge, sometimes with no additional cover but more usually associated with a clump of low shrubs. More nests in Maine have been found in a combination of sedge-sweetgale-leatherleaf than any other cover type. The nest base may be virtually surrounded by water, whether in a wet marsh or on a small island. Floating islands of northern bog lakes and ponds, and the floating sedge mats that border many woodland streams, are favorite nest sites. Their wet situations discourage many of the land predators, and their "floatability," while not unlimited, does allow for minor fluctuations in water levels without danger to the eggs.

The nest is quite shallow, constructed only of grasses and sedges that are within reach of the female as she sits or stands at the site. She lays one egg a day until the clutch, which averages nine, is complete. Toward the latter part of the laying period, the hen gradually adds a nest lining of breast down to afford insulation for the eggs. When she leaves the nest to join her mate and to feed, she covers the eggs with the down, thus making them less conspicuous to a potential predator.

A ring-neck's nest with 10 eggs in a clump of sweetgale and sedge. Vegetation in the foreground was pulled aside to permit the photograph.

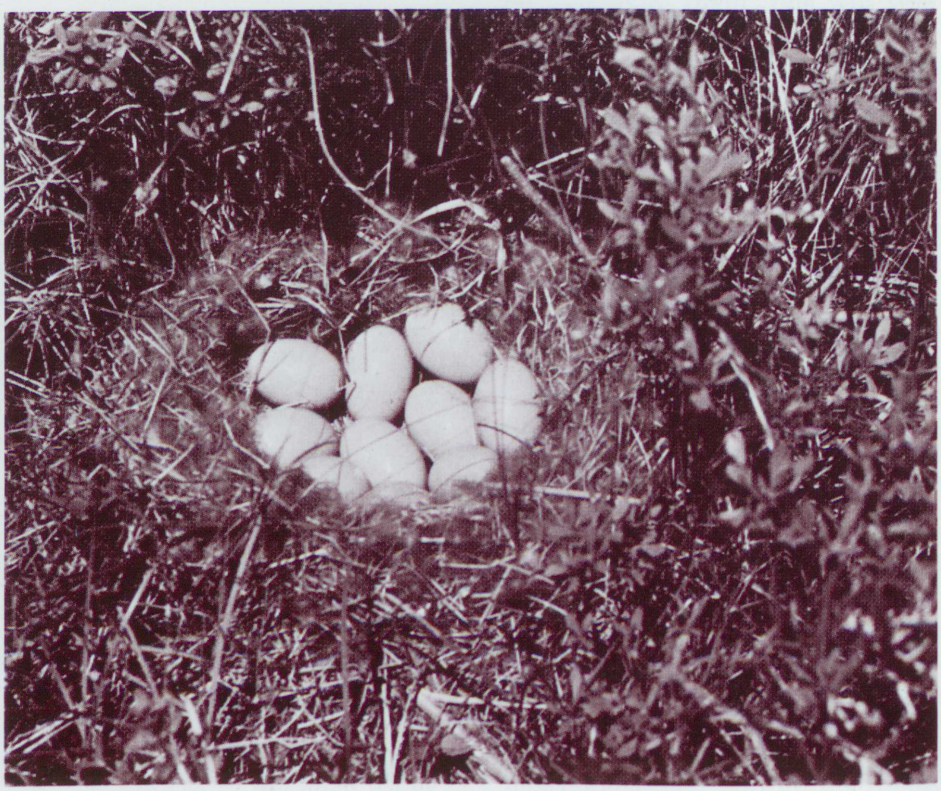


Photo by the author

Although only a few hours old, these ring-necks are nearly ready to leave the nest.

INCUBATION BEGINS when the last egg is laid and continues for 26 or 27 days. Generally, all young hatch within a span of 5 or 6 hours, and in another 2 to 4 hours, the down of the ducklings is dry. The amount of time the young are brooded in the nest depends on the weather and the time of day hatching occurs. Ducklings that hatch during the night or in early morning are usually led from the nest by the female before sunset. If, however, hatching takes place during mid-day or afternoon, they remain in the nest overnight. Cold, wet weather usually delays nest departure, while disturbance by predators or humans hastens it.

The ring-neck is one of the most devoted of all duck mothers. Her "broken wing" or injury-feigning act in time of danger is much more persistent than that of many other species and often appears quite effective in encounters with some of the mammalian predators such as minks and foxes. Ring-neck hens generally remain with their broods throughout the entire rearing period, in contrast to many ducks which often desert the young when the latter are half or two-thirds grown.

During their first few days, the downy young, which are a deeper yellow than any other Maine duck, feed on insects found on the surface or among emergent vegetation. But when less than a week old, they start making short dives for soft-bodied animal life beneath the surface. By the time the ducklings are half grown, they are skilled at diving and submerged swimming. The first flights are made at seven-eight weeks of age, and then the young are on their own. They may remain near the breeding marsh until the southward migration, or they may depart for larger lakes or rivers to join other ring-necks.

Bringing her family of ducklings to the flying age is not a simple task for the hen ring-neck, who faces many adversities. Despite the duck's tendency to locate the nest on a semi-floating base, heavy rains sometimes cause water levels to rise and flood the eggs. Predators of eggs are a constant threat, especially crows, ravens, minks, raccoons, and foxes. The last three occasionally kill incubating females as well as eat eggs and ducklings.

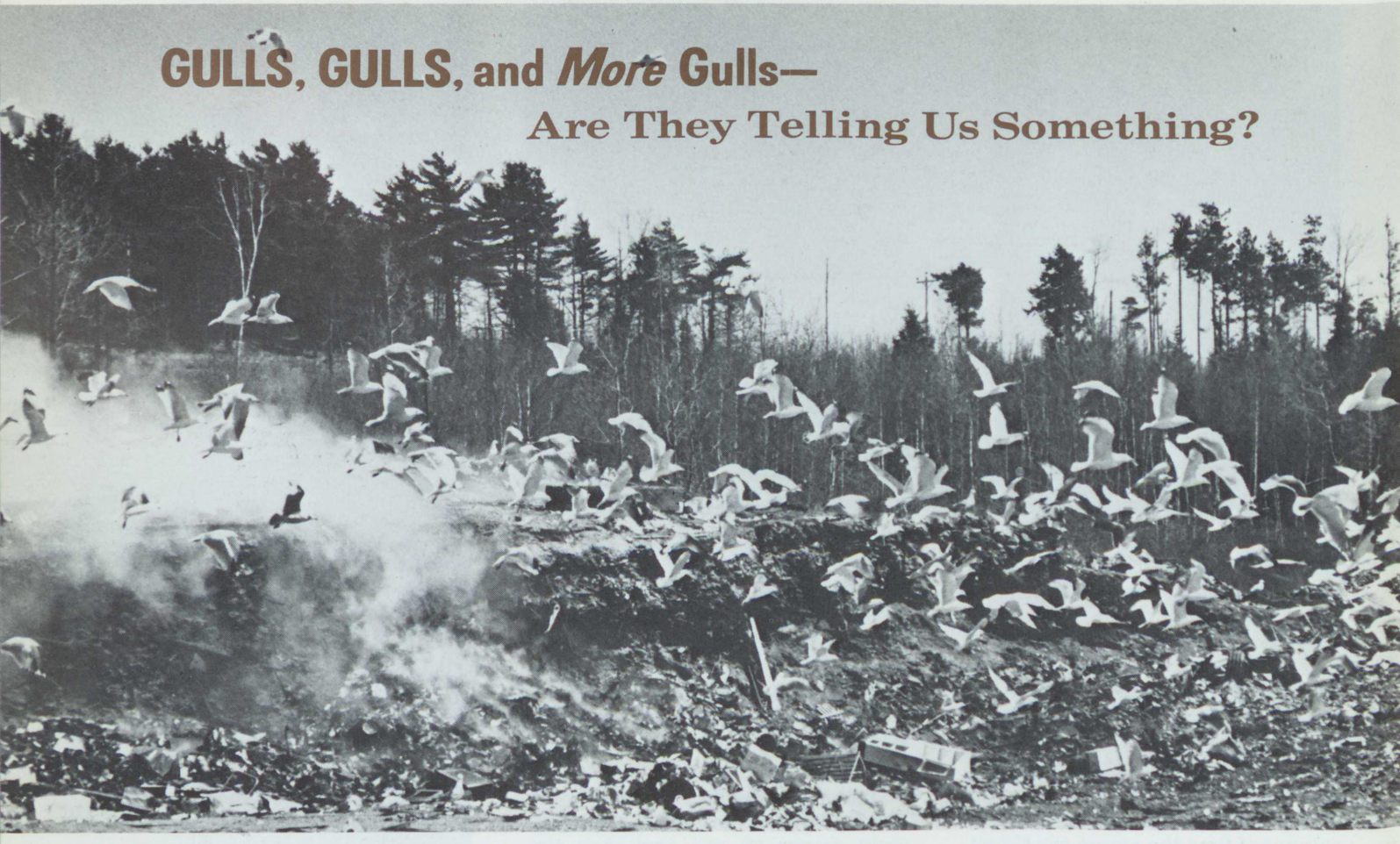
An important factor influencing nesting success is man. Most ducks, but especially the ring-neck, desire peace and quiet on the breeding grounds. Frequently, disturbances by picnic parties, sightseers, and especially traffic by boats with high-powered outboard motors, cause nest desertions, induce more predation than normal, and disperse the broods. All too often, some of the ducklings that become scattered never rejoin the family, and they soon die.

THE RING-NECK is not an important game bird in Maine as a whole and makes up less than 5 per cent of the annual waterfowl harvest. However, on a local basis, it is often of considerable importance. This is especially true during October hunting in the interior of Washington County, in the bog lakes of Aroostook County, and in portions of the Mattawamkeag, Penobscot, and Sebasticook drainages and in the Saco Valley. On some of these marshes, early season hunters may shoot as many ring-necks as black ducks.

What caused a portion of the mid-western population of ring-necks to make such a remarkable change in breeding range is an unanswered question. That it was not a gradual eastward movement but an abrupt jump over many hundreds of miles makes it even more noteworthy. Was a sizeable flock in northward migration forced far off course by a major weather disturbance and found themselves at breeding time in waterways that resembled their normal range? Did extensive habitat loss during the famous drought of the 1930's necessitate a deliberate search by the birds for new habitat? Some evidence would support this theory because of the timing. The mid-western droughts, dust bowls, and loss of waterfowl habitat did coincide, as best we can determine, with the arrival of the ring-necks in Maine and New Brunswick. Whatever the reason, the success of the "transplant" undoubtedly lies in the fact that the ring-neck has the biological qualities of a pioneering species. Otherwise, the scattered little colonies of ring-necks would have existed only briefly, then faded into history.

SO, WHETHER THEY call him a ring-neck, ring-bill, marsh duck, little bluebill, or blackjack, the duck hunters and bird watchers of the Northeast are grateful for this transplanted mid-westerner who is now well established a thousand miles from where nature intended him to be. ■

GULLS, GULLS, and *More* Gulls—
Are They Telling Us Something?



By Richard B. Anderson,
Director, Maine Audubon Society

IN THIS DECADE of concern over the continued existence of many species of birds, mammals, and fish, the seagull population thrives and continues to multiply at an extremely rapid rate. Gulls, probably more than any other bird species, have been able to adapt to the ways of man. They have taken advantage of the wasteful, thoughtless methods by which man disposes of materials generally described as waste. In ever-increasing numbers, gulls strive to utilize the unending food supply provided by open dumps, multitudes of raw sewage outfalls, and the misplaced refuse created by the commercial fishing industry. In fact, the present excessive gull populations have become dependent upon man for their very existence.

The Maine Audubon Society has produced a slide series entitled, "Gulls as a Biological Indicator of Pollution" which deals with the problems discussed in this article. If your club or organization is interested in using this extremely educational slide series, contact the Maine Audubon Society, 57 Baxter Blvd., Portland, Maine 04101, for further details.

Several different species of "seagulls" inhabit Maine at various times during the course of a year. Maine's most abundant seagull, the herring gull, *Larus argentatus*, is the most widely distributed gull of the Northern hemisphere. Circumpolar in distribution, the herring gull breeds from Ellesmere Land to Manitoba and New Jersey; in Europe, to Northern France and the White Sea. It winters wherever there is open water throughout its range, as far south as Cuba and the Mediterranean Sea.

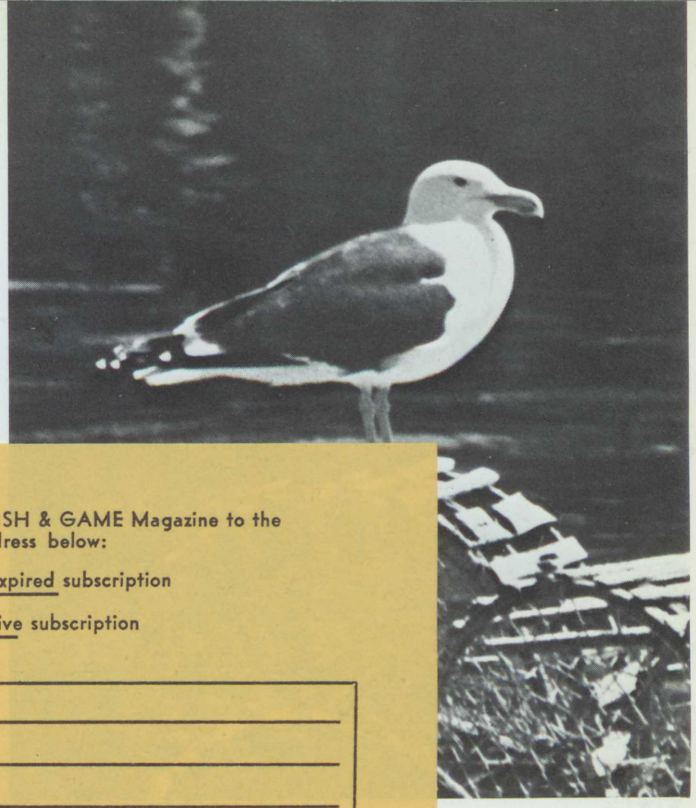
Roger Tory Peterson, in his book, *Field Guide to the Birds*, describes the herring gull as follows:

> "Adult: The only large gray-mantled (mantle= upper surface of wing) gull that combines black wing-tips and flesh-colored legs.
>
> Immature in first year: The common dusky-brown gull one sees in large numbers. No other young gull is quite so dark and uniform in coloration.
>
> Immature in the second year: Whiter. The tail-feathers are dark, contrasting with the white of the rump."

The second most abundant gull in Maine is the great black-backed gull, which is much larger than the her-

ring gull. The dark, slaty color of its back and wings stands out plainly against the white of its underparts. Immature birds resemble corresponding stages of the herring gull, but are less brown and paler on the head and underparts.

Other species of gulls seen frequently in Maine include the laughing gull (smaller than the herring gull, with a black head) and the ring-bill gull (almost identical in color pattern with the herring gull but slightly smaller, with a conspicuous black ring on the bill).



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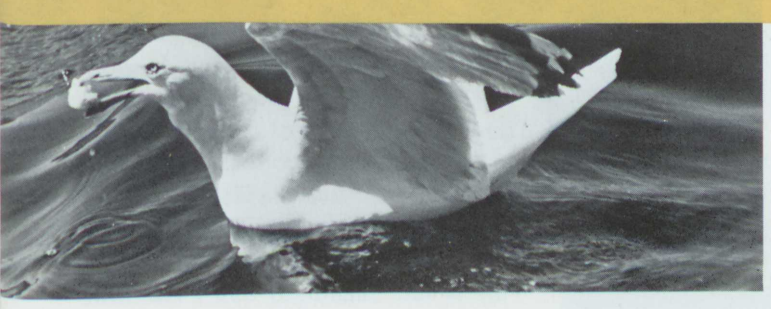
reservoir at Munjoy Hill to keep the gulls away. Other New England towns have encountered similar problems.

Another gull-caused problem, of particular interest to fresh-water fishermen, is the relationship between gulls and a parasite of landlocked salmon. The adult tapeworm lives in the gut of the gull, and its eggs are introduced into fresh water with the gull feces. Upon entering the water, the eggs are eaten by a small organism called a copepod. The copepod is eaten by a small



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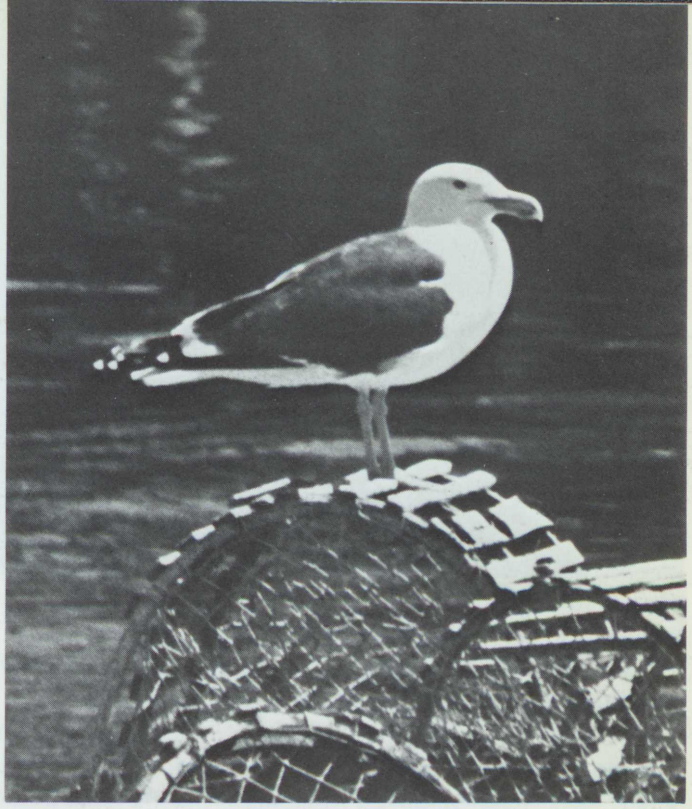
This article deals particularly with the herring gull, although much of the information is also applicable to the great black-backed gull, whose habits are similar.

IN 1900, the herring gull was a rare sight along the New England coast although earlier they had been plentiful. Indians first, and then the early settlers, regularly collected their eggs for food. In the latter part of the 1800's, gulls were regularly killed for their feathers, which brought a high price in the millinery trade. Gull populations continued to decline until shortly after the turn of the century, when the National Audubon Society and a concerned public were instrumental in passing laws to protect herring gulls. The collecting of their eggs was forbidden by this legislation. Partly because of this protective legislation, the herring gull population along the New England coast began to expand rapidly. Since about 1940, the population has doubled about every 15 years, until today an estimated 120,000 pairs nest along the New England coastline.

Experts attribute the expansion of the herring gull population not only to protection but to an ever-expanding food supply. Herring gulls are omnivorous and will eat virtually anything. One factor that led to their initial protection was their habit of cleaning our coastline



The great black-backed gull, second most common gull in Maine.

of the natural refuse washed ashore by the sea. The tremendous increase in human refuse, both solid and liquid, has resulted in a proportionate expansion of gull populations. Today, the majority of herring gulls are living in or near urban centers in order to take advantage of the large food supply provided them in the form of refuse.

The increase in gull numbers has caused some problems, the most serious of which are gull-aircraft collisions. Since 1955, more than one-half of the bird strikes at Logan International Airport in Boston have involved gulls. It has been estimated that more than 100 persons have died since 1960 as a direct result of bird-aircraft collisions, and the majority of these collisions have involved gulls.

Herring gulls prefer fresh water for drinking and bathing, a habit that has caused problems on water supply reservoirs located near the coast. The transfer of harmful bacteria from feeding areas to bathing areas is a definite problem in many water supply systems. As long ago as 1949, Palmer, in his book *Maine Birds*, writes that the Portland Water District was forced for sanitary reasons to string steel wires across the city reservoir at Munjoy Hill to keep the gulls away. Other New England towns have encountered similar problems.

Another gull-caused problem, of particular interest to fresh-water fishermen, is the relationship between gulls and a parasite of landlocked salmon. The adult tapeworm lives in the gut of the gull, and its eggs are introduced into fresh water with the gull feces. Upon entering the water, the eggs are eaten by a small organism called a copepod. The copepod is eaten by a small

Once rare even on the coast, the herring gull is now a familiar sight on waters far inland.

salmon or other fish, and the fish are eaten by the gull. While larval stages of the parasite live in the copepod, small fish, and salmon, it is only in the body of the gull that the tapeworm finally becomes an adult. Needless to say, due to this complicated life cycle, few of the millions of eggs introduced into fresh water ever reach adulthood.

Under some conditions, salmon ingest large numbers of larval tapeworms, and these larvae lodge in the body cavity of the salmon. The irritation caused by an abundance of encysted larvae results in the female salmon's being unable to spawn, thereby reducing natural reproduction of landlocked salmon in our Maine lakes. The proliferation of open burning dumps throughout Maine has attracted large numbers of gulls to all inland areas of the state. Gulls feeding on the local dump usually travel to a nearby lake to bathe, drink, and defecate, introducing tremendous numbers of tapeworm eggs into practically every inland body of water in Maine.

WHILE SEAGULL numbers have been increasing, populations of other coastal birds have been declining at a rapid rate. Between 1930 and 1950, the tern (commonly called mackerel gull in Maine) population in the Nantucket Sound-Buzzards Bay area of Massachusetts remained stable at between 15,000 and 30,000 pairs. In 1968, the Massachusetts Audubon Society counted only 7,500 pairs. Nesting populations of terns and laughing gulls have declined along the Maine coast, also.

The large gulls compete with terns, laughing gulls and puffins for nesting territory. Herring and black-backed gulls, being larger and more aggressive, drive these birds from their traditional nesting areas. They eat the eggs, the young, and in some cases the adults of many of our coastal birds including puffins, several species of ducks, laughing gulls, terns, and guillemots.

Competition between gulls and eider ducks is a particularly interesting example of the ecological effects of man's presence. Eiders and gulls usually choose the same type of nesting habitat, and their nests intermingle in many colonies. The problem results when the hen eider is flushed abruptly from the nest by a person walking among the colony. Leaving hurriedly, the hen eider does not camouflage her nest as she would if she had left voluntarily. When the human visitor leaves the colony, the gulls return immediately to the area and easily locate the exposed, undefended, eider nests. The ensuing feast can drastically reduce the nesting success of the eiders. Without interference from man, eider populations are apparently able to withstand the predation from gulls, a fact that is attested to by the tremendous increase in the numbers of both species of birds over the last 40 years. The simple solution to the problem is for the public to avoid landing on or exploring coastal eider nesting islands during the eider nesting season, which includes the months of May and June.

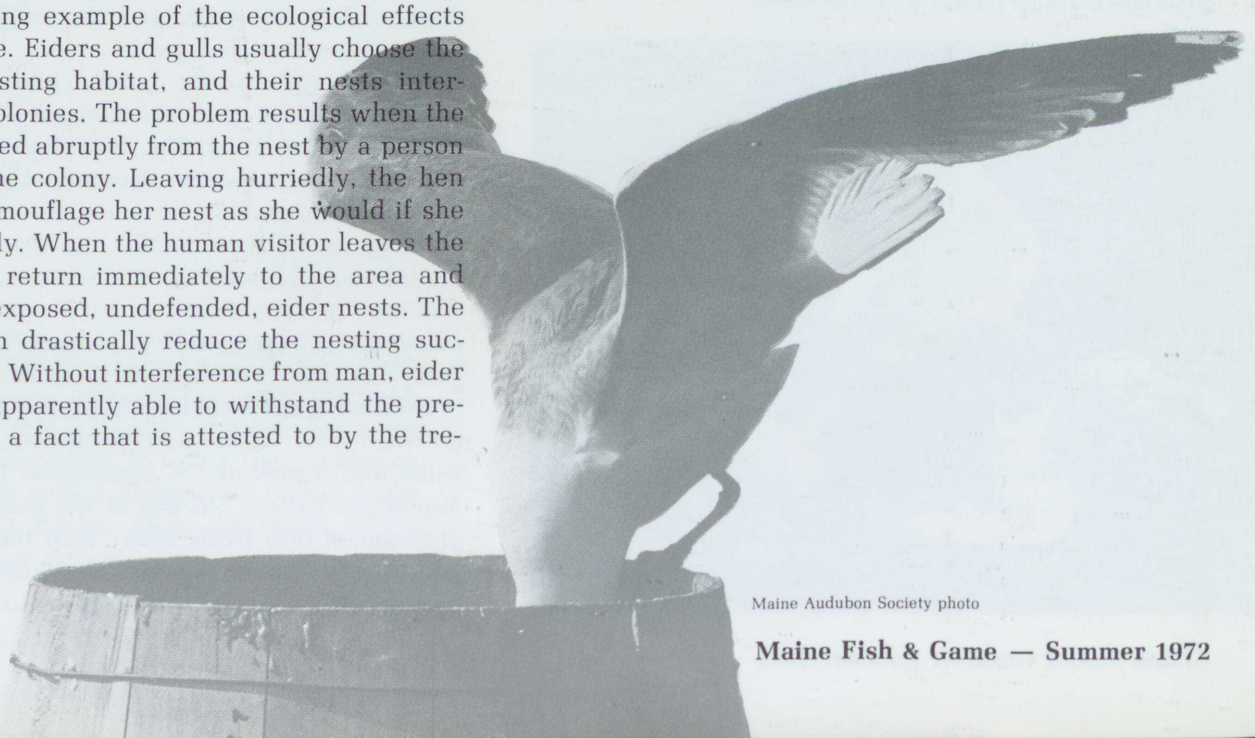
ONLY A FEW of the problems resulting from high gull populations have been considered here. Ask a blueberry grower or a coastal boat owner what he thinks of gulls, and you'll find out more.

But what of a solution? It is a complicated one, and it will not be worked out overnight. It's not as simple as killing gulls or poisoning their eggs. As long as we continue to provide an abundant food source, we will have little success in controlling the gull population explosion. It's something like trying to control rats in the barn while you spread 100 pounds of corn on the floor every night—it can't be done!

We must attack the problem at its roots. Open burning dumps and raw sewage outfalls must be eliminated, and the commercial fishing industry must do a better job in handling its waste. These solutions will, in the long run, solve the problems created by an overpopulation of gulls.

In a much larger context, these problems we *must* solve in order to maintain a liveable earth. The gull is but an indicator of the mess we have made—an animal that has adapted to the existing circumstances while populations of other, less adaptable birds like the bald eagle and peregrine falcon decline annually.

A declining gull population will be a harbinger of an improving environment for all the animals of the earth—including man. ■



Maine Audubon Society photo

SWIMMER'S ITCH

By Robert E. Foye
Assistant Chief, Fishery Division

SOMETIMES, bathers in Maine are plagued by a rash soon after emerging from the water, and a typical reaction is often: Call the Fish and Game Department and find out what is causing it. (It is better to consult a doctor.) Naturally, a precise diagnosis cannot be given until a careful investigation is made of each inquiry, but such rash symptoms are often caused by an organism living in the water.

Larval stages of certain trematode worms known commonly as flukes have been shown to produce a rash by penetrating a person's skin. These larvae occur in various waters of the north-central and northeastern United States. Typically referred to as *cercariae*, they are very small, colorless organisms, almost invisible without being magnified. The adult worms are parasitic and live within some birds and mammals.

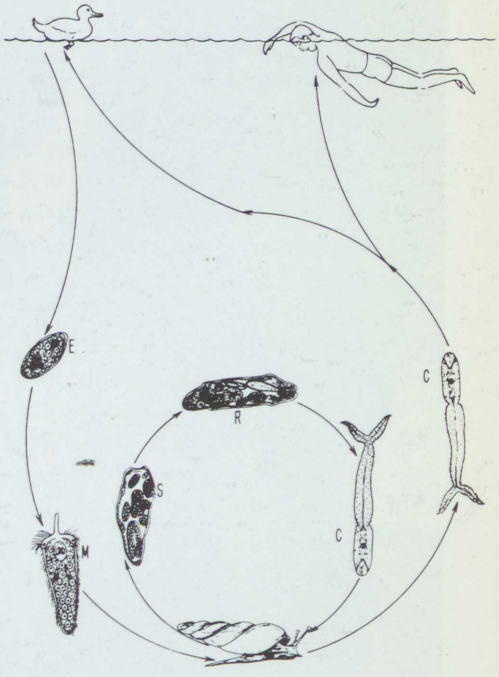
The life cycle of this troublesome parasite involves certain species of snails as an intermediate host. Eggs from the adult worms are passed into the water with the feces of the final host. The eggs hatch in the water into a free-swimming organism called a *miracidium.* If a suitable snail host is available, the miracidium penetrates it. Two additional stages of the same parasite are produced in the snail. The last stage emerges from the snail and swims freely about searching for a proper vertebrate host in order to complete its life cycle.

Man is not a definitive host of the swimmer's itch organism, but sometimes cercariae, when they encounter bathers, partially penetrate their skin. Full penetration occurs after the bather emerges from the water, and this is associated with a prickling sensation. Red spots appear at the points where the organisms penetrate. This may be followed by irritation and redness in the form of minute spots which turn into noticeable red elevations of the skin, up to 1/4 inch in diameter.

Some bathers are more resistant to swimmer's itch than others. Depending upon the degree of infestation and the sensitivity of the individual, one may experience little or no reaction, a slight itching, or even severe swelling, pain, and fever. Swollen areas usually disappear within a week although the redness may take longer to leave.

Because full penetration of the worm through a person's skin does not occur until one leaves the water, the easiest method to prevent excessive skin irritation is by rubbing one's body with a coarse towel before drying off completely. This effectively crushes the organism before it has gone completely through the skin. A shower bath immediately after emerging from the water is also helpful.

Chemical control of the swimmer's itch problem is a complicated process involving destruction of the snail host. Chemicals containing a copper sulfate-hydrated lime mixture have been found to be effective. However, control measures involving chemicals can easily affect the aquatic environment by disrupting the food chain of some aquatic animals, including fish. The chemicals may also have a direct toxic effect upon fish. Maine laws regulate the use of chemicals in all state waters; their use to control swimmer's itch and other problems associated with fresh-water environments should be carefully supervised.



Life cycle of swimmer's itch cercariae, described in the text.

THE COYOTE

Maine's Newest Wildlife Resident

By Peter A. Cross, Game Biologist
Maine Department of Inland Fisheries and Game

Voit B. Richens, Assistant Leader
Maine Cooperative Wildlife Research Unit

Roy D. Hugie, Graduate Assistant
Maine Cooperative Wildlife Research Unit

AN INTERESTING biological phenomenon has been the spread of the coyote across the northern United States and southern Canada. Long considered an animal of the open plains, the coyote has become established in the northern woods. Coyotes first showed up in Michigan and Ontario in the early 1900's. They spread into New York in the 1920's and by the mid to late 40's appeared in Vermont, New Hampshire, and Quebec.

Warden Charles Bessey with a coyote shot in Starks in 1971.

Coyotes apparently found favorable conditions in these states and provinces. Biologists feel that there are 4,000 to 6,000 coyotes in the northern part of Minnesota and about 500 in Vermont. Until recently, Michigan paid more than 3,000 bounties on coyotes each year, and Ontario has paid about 2,000 per year. A few coyotes have been reported in Connecticut, Massachusetts, and New Brunswick.

Although coyotes were reported in Maine prior to 1968, most have been noted since that time. During the 1968 hunting season, several wild, dog-like animals were shot in the Upton area along the New Hampshire border; these were sent to the Maine Cooperative Wildlife Research Unit at the University of Maine, Orono, for identification. Carcasses were tentatively classed either as dogs or coyotes based on skull and body measurements and physical appearance. These classifications were later verified by Dr. John L. Paradiso of the U. S. National Museum in Washington, D. C.

Since 1968, other specimens have been collected by game wardens, game biologists, and interested sportsmen. Many of these animals have come from the Upton area, but individuals are now showing up in several regions of the state as shown in the map.

The Wildlife Research Unit, under the supervision of Assistant Leader Richens, has processed nearly three dozen specimens. Graduate assistants have removed the pelts of the animals, cleaned the skulls, and examined stomach contents for food habits determination.

One of the most interesting aspects to date has been determining whether the animals are wild dogs, wolves, coy-dogs, or coyotes. Results show that two were dogs, and 33 were coyotes; there were no wolves or coy-dogs.

The coyotes tended to be heavier and darker than their western cousins. These animals will probably be called *eastern coyotes* as recommended by several researchers. It has been theorized that in spreading eastward through Canada, some wolf genes were added into the coyote stock through matings with the small Ontario wolf. It has been shown recently that wolves and coyotes can successfully mate, thus adding credence to this idea. The likelihood of dog ancestry is reduced, due to differences in breeding seasons of dogs and coyotes, lack of true-breeding in coy-dogs, selectivity against coy-dogs by unfavorable mid-winter whelping, and low survival of coyote-dog crosses under wild conditions.

The addition of the coyote to the wildlife of Maine has created both interest and concern. In addition to the laboratory work being done by the Wildlife Research Unit, a monitoring program has been directed by Regional Biologist Cross. This program consolidates field reports of coyotes and coyotes' activities from

Department personnel and interested citizens. Anyone who believes he has some pertinent information concerning coyotes is asked to contact the Fish and Game Department.

The Wildlife Research Unit would like to obtain as many coyote specimens as possible. The help of the general public is sought in turning in specimens to any Department employee, who will send them along to the Wildlife Research Unit. Carcasses that have not been dressed or pelted are especially valuable as they yield greater returns in scientific information on identification and food habits.

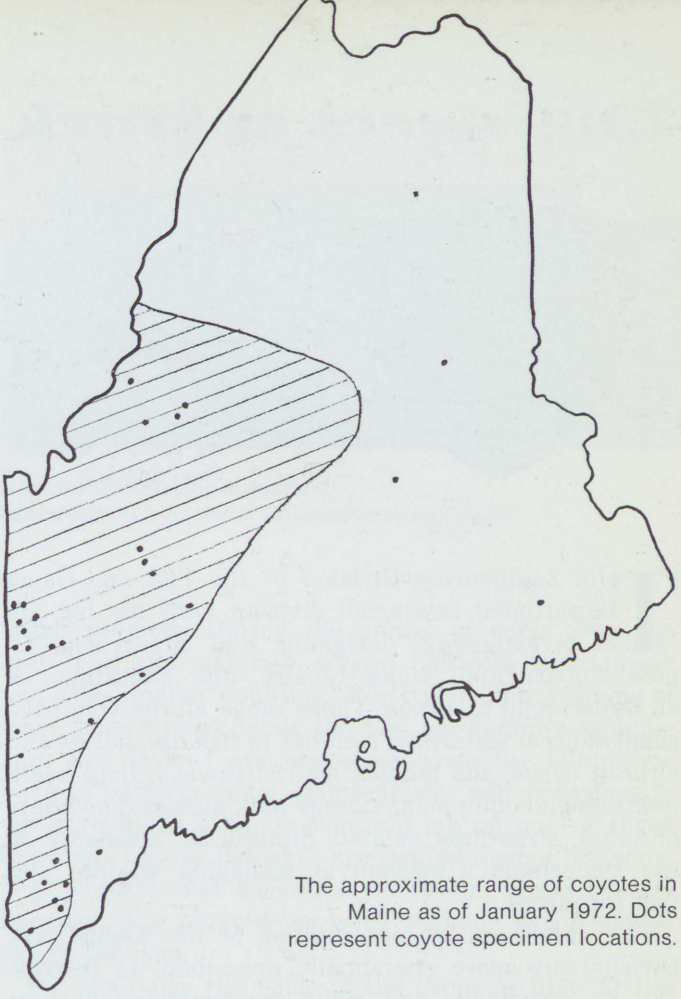
JUST WHAT is the coyote situation in Maine right now? Their range, as depicted on the map (cross-hatched area), is the result of interviews with district game wardens in early 1972. Coyotes have been reported outside this area but do not appear to be firmly established yet. Warden estimates of coyote numbers in their districts suggested a statewide population of 125 to 550 coyotes. The estimate in September 1971 was 50 to 320 animals. It should be pointed out that these figures are only rough estimates, but they may show a trend toward an increasing coyote population.

The coyote appears to be keeping to well-wooded and sparsely populated sections of the state, but there are occasional sightings near towns. This seems to be the case in other states, too. Apparently, the eastern coyote is a secretive animal and purposely avoids man, perhaps as a result of being harassed.

The most frequent question about the coyote concerns his effect on deer numbers. The coyote is capable of killing deer, especially when the deer are at a disadvantage resulting from disease, malnutrition, accidents, old age, or small size. That coyotes seldom do so, even though they have this ability, has been well documented. Biologists of many states have found deer to be an important food item to the coyote but mainly as carrion, as far as could be determined. Some coyote kills are diseased, starving, or weakened deer. These deer have been called "walking carrion"; many would die in the absence of coyotes, and their loss is not harmful to the remainder of the deer herd.

In Vermont, workers have found that the amount of deer meat, in the stomachs examined, closely coincided with the hunting and winter seasons when dead or weak deer were available. This is also the case in Maine. Evidently, coyotes are not too fussy about the food they eat, as some of the stomachs taken during the late spring contained deer meat infested with maggots. The coyote was not considered to be a problem to deer herds in any of the many states or provinces contacted although some losses to coyotes were known to occur.

What does the coyote eat besides deer? Many studies show that coyotes feed on what is most available and easiest to obtain, regardless of whether it is dead or alive. Snowshoe hares, rodents, birds, insects, apples, grass, garbage, and fruit are all utilized at times in other states, as in Maine. Stomach analyses at the Wildlife Research Unit showed snowshoe hare and deer to be most important. Most of the stomachs were obtained during the fall and winter period when carrion is available as food. We do not know how much of the meat represented coyote-killed deer or how much was found dead. The other items of food appear in the diet much like what has been found in other states.



The approximate range of coyotes in Maine as of January 1972. Dots represent coyote specimen locations.

IT APPEARS that coyotes are in Maine to stay. Their ability to travel extensively, their use of a wide variety of foods, their secretive habits, and their tolerance to civilization favor their permanence in the state. We hope that Maine will be far-sighted enough to stay away from bounties and control programs as they are both expensive and ineffective. Other states and the federal government have spent millions of dollars trying to control this adaptable animal, with little apparent success. Payment of bounties wastes the sportsmen's dollars and promotes fraudulent claims.

Man, in the past, labelled predators as "vermin" and persecuted them intensively because the predators competed with him for certain wildlife resources. Yet, predators are important in most natural communities. The new general awareness of predation as a natural and useful function is a definite improvement in man's thinking, and it is hoped that this appreciation has come at the right time. ■

Engineers at Work

By John L. Ketner
Chief Engineer

THE Engineering Division of the Fish and Game Department is a small division with the big job of investigating, designing, and supervising all new construction, major repairs, and alterations of all Department facilities. These range all the way from small dams at waterfowl marshes to fish hatcheries and aircraft bases, and include many fishways, field headquarters and equipment storage buildings, and a variety of other structures related directly or indirectly to the Department's mission of managing wildlife and fish resources.

The duties and responsibilities of the Engineering Division are more specifically described as follows:

1. To investigate and make recommendations concerning projects proposed by the Commissioner and by various divisions of the Department.
2. To make site surveys of requested construction and prepare designs, specifications, cost estimates, and contract documents for submission to the Commissioner for approval.
3. To investigate and prepare designs of fishways for submission to owners of dams, when the Commissioner determines that such fishways are required.
4. To survey certain properties to be purchased by the Department and to re-survey existing Department properties when requested.

In conforming with the above, we have performed the following work during the past year:

Engineering Division designed and built this fishway on the Crooked River last year, opening up many miles of spawning area for Sebago Lake salmon.

Fishways: James W. Smith of Newport, Maine, was awarded the contract to build a fishway in Guilford Industries, Inc., dam on the Piscataquis River in Guilford, Maine, for the sum of $66,130. The project is essentially complete. One-half of the cost of this fishway is being paid by Guilford Industries, with the balance coming from federal monies made available through the Anadromous Fisheries Act. Clayton Grant was the Division's representative on this project.

Designs and specifications have been completed for a fishway in each of the two Beggs and Cobb, Inc., dams on the Piscataquis River in Dover-Foxcroft. These two projects are scheduled to be built during the 1972 construction season. One-half the cost of both of these fishways will be paid by Beggs and Cobb with the balance coming from Anadromous Fisheries Act monies.

We designed fishways for installation in two privately owned low-head dams in the southern part of the state. Construction of one of these has been completed, and the other we hope will be completed this year. Both of these fishways open up large spawning areas for landlocked salmon.

During the last year we assisted the Department of Sea and Shore Fisheries in fishway design for two fishways: one which is completed at Bristol Mills on the Pemaquid River, and one on the outlet of Boyden Lake in Perry, which is under construction now. The contractor for both of these projects is the Bridge Construction Corporation of Augusta.

Since 1967, fishways have been completed on the Penobscot River at Bangor, Veazie, Great Works, Milford, and West Enfield and on the Piscataquis River at Guilford, with the two at Dover-Foxcroft to be done this year. Total costs of these fishways is nearly one million dollars.

In addition to these fishways is one built in 1964 on the Piscataquis River in the Bangor Hydro-Electric Company's dam at Howland. The Great Northern Paper Company just completed renovating an existing fishway in their dam at Mattaceunk on the Penobscot River.

Completion of the two fishways in Dover-Foxcroft will bring to a close, for the present time, fishway construction on the Penobscot and Piscataquis rivers.

Dams: The Department owns several low-head log crib and concrete dams throughout the state which require periodic attention. The concrete dam at Raymond, which provides water for the Sebago hatchery, our oldest hatchery, needs repairs which we plan to make during the 1972 construction season. Along with this dam, we plan to replace the log crib dam on the outlet of Embden Pond with a concrete structure. The log crib dam was built in 1956 to stabilize the level of Embden Pond which supplies water to the Embden fish rearing station. Work on several other log crib dams built in the mid-1950's which need to be repaired or replaced will have to be started within a year or two if we hope to continue using them.

Another dam we plan to replace soon is the one at the outlet of Meddybemps Lake. This structure will help maintain a constant flow from the lake which is the headwater of the Dennys River. In addition to the dam, we will have to build a fishway.

Buildings: We have completed a three-bay unheated storage building at our Ashland regional headquarters. This building will be used to store out-of-season equipment such as snowmobiles during the summer and boats during the winter. It was built under the supervision of one of our construction foremen, Forrest Smart, with a crew made up primarily of local employees.

In addition to this, we repaired two garages at the Deblois hatchery. This job consisted of placing new concrete slabs and moving the existing garages onto them. The same kind of project was completed at the Palermo hatchery for one garage.

A short time ago the Department received a gift of some property in Machias which had an old wooden mill building on it, called the Getchell Mill. This building was a liability to the Department as it was broken into and used by unauthorized persons. In order to correct this situation, we demolished the building. This work was done very satisfactorily by Morse and Thorsen Company of Ellsworth under a contract.

For several years, our Fishery Division has had its research unit in one of the University of Maine's buildings at the Bangor International Airport. When the University recently requested that this unit be moved into another building at the airport, extensive renovations had to be made in the "new" building. This work was performed by our other construction foreman, Raymond Lemelin, who was assisted by our carpenter, Charles Tappan.

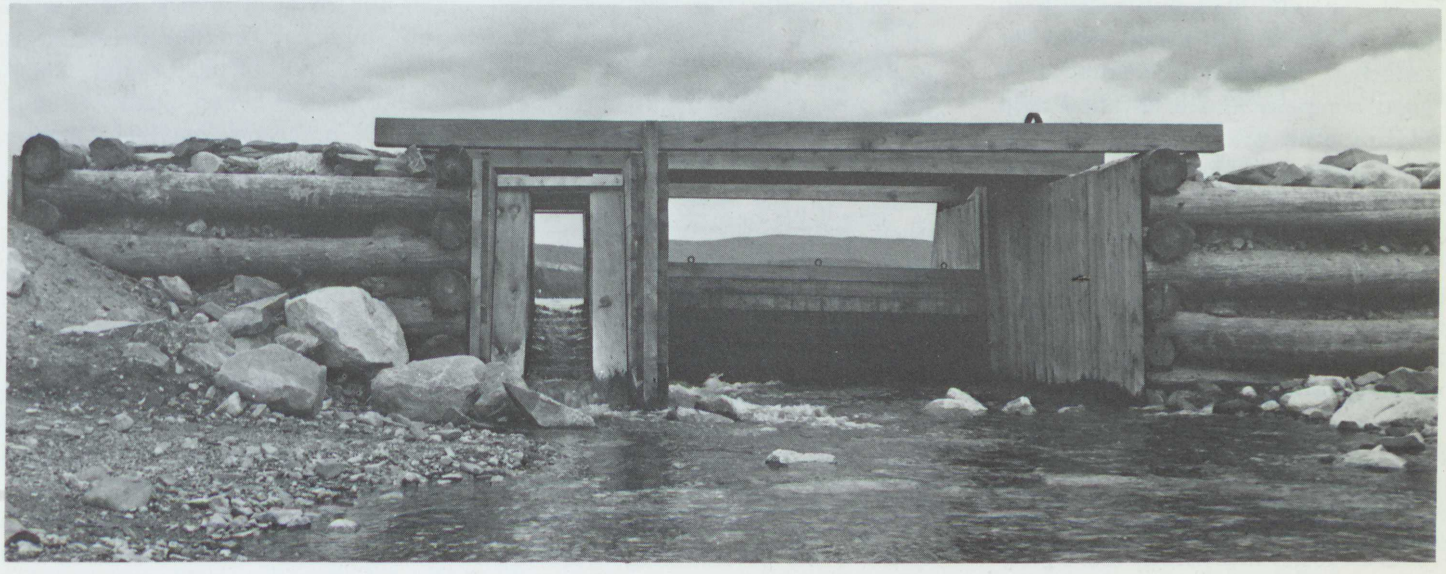
New storage building at Ashland headquarters, built under Engineering supervision.

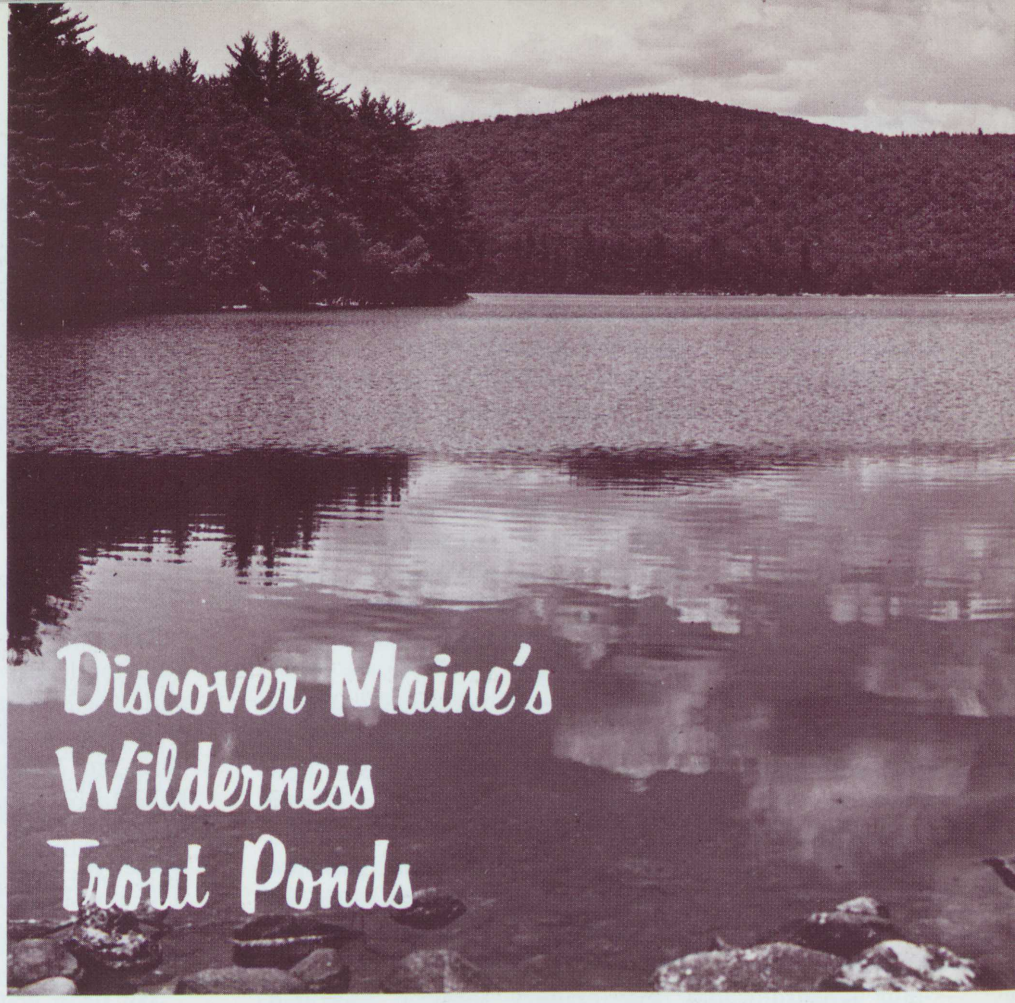
Other projects: During the spring of each year, we help tend and maintain several fishways in Hancock and Washington counties. We try to check them at least once a week while the fish are running to make sure the devices are operating correctly. Often, we have to perform minor maintenance, and occasionally we have to do a minor overhaul job on one of these fishways. Unless fishways are tended during the runs, it is possible that an entire yearly run could be lost because of a plugged-up trash rack or some similar minor problem.

We have also run some of the property lines at the Game Farm in Dry Mills. Forrest Smart was busy last winter making duck nesting boxes for the Game Division and performing miscellaneous maintenance work for the Warden Service.

AS YOU CAN SEE, the work we do varies quite a lot which makes it very interesting from year to year for the staff of the Engineering Division. ■

Department engineers build and maintain dams at hatcheries, wildlife management areas, etc.





Discover Maine's Wilderness Trout Ponds

THERE'S FISH in them thar' hills! If your summers of fishing in Maine have been limited to fishing the "big lake," bordered with private and commercial camps, the lake covered with water-skiers, joy riders, and scores of other anglers, then you have been missing the enjoyment of the "wilderness trout pond experience." Let's listen to Mr. Vacationer who has spent several summers at a camp on, let's say, Great Lake:

"I have been coming to Maine for the past six years. Every year it seems to get more and more crowded at Great Lake. There are more fishermen, more campers, more people everywhere. I come here for some peace and quiet... to get away from people. I usually spent a few weeks at this camp on the lake and went no where else. This summer I tried something different. I had heard some of the locals talking about trout ponds in the more remote areas, and I decided to do some investigating. You know, trying to get directions to a favorite trout pond from one of these natives is darn near impossible."

Mr. "V." finally ended up at the local sport supply shop where he bought maps of the area and talked the clerk into giving him directions to one of the ponds. That evening, Mr. "V." prepared for his next day's trip. Having some knowledge of the woods, he knew enough to take whatever he would need for entering unfamiliar territory. A good compass and a detailed map of the area are a must. Several flies were suggested by the store clerk. Mr. V. had most of those suggested, plus some favorites of his own. Thoughts of the next day's fishing filled Mr. V.'s mind as he waited to fall asleep.

"I was on the road at dawn. I had sketched the directions onto my map so that I could at least start out right. My destination was some seven or eight miles back in the boonies. Most of the distance I could use my four-wheel drive pick-up. I not only could use it, I *had* to use it. After the first few miles of logging road, I came to a washed-out bridge. From there on, the road had been abandoned. It was badly rutted and the sides had eroded in several places. The going was rough, but I made it to where the clerk had told me the foot trail started.

"I had about 3/4 of a mile to hike in. Supposedly, the trail was blazed to within sight of the pond. True to directions, the beginning of the trail was marked by an old birch stump with a large cedar bent arch-like over it. I have seen better trails. All the young shoots and dead branches criss-crossing the path made it very obvious to me that not many people were using this area. I followed the blaze marks until I missed one. It was an easy thing to do since I was toting my canoe over my head. Luckily, my map and compass got me headed back in the right direction. It took some thrashing, stumbling, and quite a bit of fumbling with the canoe before I finally made the pond's edge. It was more than worth it.

"Without even wetting a line, I was glad I had made the trip. This was what I have been looking for all these summers...a place where I can be alone. What can be a more beautiful scene than to be overlooking a small trout pond, overshadowed by mountains, surrounded by trees of every sort, with the sound of red squirrels, chipmunks, and birds...crystal clear water that you can drink without fear of pollution...maybe a moose indulging in the aquatic vegetation that flourishes around the pond. Most important of all are the peace and solitude that accompany all of this."

IT WAS APPROACHING mid-day when Mr. V. got his canoe on the pond. His rod and fly ready, he was off. After a few hours of casting, he had tried the largest portion of his fly collection. But the fish

did not appear to be too interested. He had only a few rises all afternoon and lost the one fish he hooked, but his experience told him not to give up. He knew that he could expect better fishing in the evening.

"I knew I had better stay at least another hour if I wanted some quick fishing. I watched a doe and her two lambs come down to the shore and drink. I tried to remain still so as not to alarm them, but after a few minutes they were gone. I have seen deer on the road on my many trips to Maine, but never before have I been able to actually sit and watch them for any length of time. It was quite a sight."

Mr. V's patience paid off. The fish began to feed, and he began to catch some very nice trout. He bagged four between 12 and 14 inches and returned several smaller ones.

"I wanted to be back out to my vehicle before dark. I hated to leave this little paradise of mine, but I put down my rod and paddled towards shore. I had certainly seen larger trout and faster fishing but never under such enjoyable surroundings. I was thinking of all the years I'd spent in Maine without realizing the pleasure of hiking into one of its remote trout ponds. I was mulling over plans to return someday when — splash!...there was a trout within casting range!

"I fumbled for the rod and started stripping out line. Why I didn't scare that fish right out of the pond I'll never know. I managed to drop my fly near the ripple. The fish rose again, only out a little farther. I retrieved my line and gave it all I could on the next cast. Bang! The speckled beauty must have come two feet out of the water and hit my fly on the way down. One good snap and both fly and leader were gone. It was all over. I knew it was useless to try to get him back again."

It was dark when Mr. V. reached his vehicle. You can be sure that trout—the big one—was on his mind all the way back to camp. He was not happy with himself for having missed his "lunker," but still he knew that fish and many more like it can be found in many of the Maine wilderness trout ponds.

Fishing wilderness trout ponds is considered by many anglers to be the height of trout fishing. Many of these remote ponds have self-sustaining populations of native brook trout. Due to the limited access to the ponds, the danger of overfishing is greatly reduced. As long as the quality of the fishery remains high, stocking is not necessary. When over-fishing has jeopardized the fishery, the Department of Inland Fisheries and Game has tried to improve conditions by establishing restrictive fishing regulations or by supplementing the native population with hatchery trout.

An important feature of quality trout ponds is the absence of species of rough fish. In several ponds where excessive competition has endangered the fishery, the state has attempted chemical reclamation. All species of fish are removed. Shortly after the pond has detoxified, brook trout are reintroduced. Regulations prohibiting the use of live fish as bait are imposed on these ponds, as the reintroduction of rough fish could again create a problem of overcompetition. Reclaimed ponds carry a five fish daily limit to distribute the catch and help eliminate some of the fishing pressure; they are closed to ice fishing; and the season on them begins on the last Saturday in April each year.

MAINE'S wilderness trout ponds have appeal to more than just the angler. The person who derives his pleasure from the beauty of nature can find his own little paradise around one of these secluded ponds. Wildlife and vegetation abound. One can spend hours studying and admiring the flowers of the forest floor. With a little imagination, all sorts of shapes and figures can be seen in the old, twisted, and gnarled trees and driki along the shores of any of these ponds.

The camera buff can record whatever his mind fancies, for the possibilities in these wild areas are limitless. On any given day, several species of wildlife may be observed—from the smallest mouse to the majestic bull moose. A Canada jay or "gorbie" may perch nearby waiting for a handout. The peace may be broken by the thunderous beating wings of a grouse startled from her hiding place. The soaring flight of an osprey—or even an eagle—may be seen.

Even though these ponds are managed for brook trout fishing, it would not be true to say the wilderness trout pond is solely for the enjoyment of the angler. For matchless scenic beauty, quality fishing, and an unforgetable outdoor experience, Maine's wilderness trout ponds are beyond compare. ■

By Scott Roy
Fish Technician

INSIDE A SEARCH

By Lee G. Downs
Warden Inspector

THE Fish and Game Department's Warden Service is responsible for locating anyone who has gone into the forests of the state for any reason — whether it be fishing, hunting, camping, or just for a walk — and failed to return. Game wardens also assist in the recovery of drowning victims.

Specializing in these unpleasant-but-necessary functions, the Warden Service has a seven-man Search and Rescue Unit whose members are trained for mountain rescue work and scuba diving. I have seen them working under extremely dangerous and cold conditions to get the job done.

For the vast majority of the people who have never participated in a search and probably never will, I will attempt to tell what goes on inside a search, some of the pressures involved, the kinds of people who show up for reasons best known to them, and some of the modern aids that the Department uses in searches for lost or missing people.

The age and physical condition of the lost one — along with the time of year — determine the amount of manpower and equipment deployed at the outset of the search. A lost fisherman in the summer is in no danger of perishing from the elements, even though he may spend an uncomfortable night out and get a few insect bites. Usually, a district game warden handles this incident as a routine matter, and the fisherman is on his way home before noon.

The lost hunter in the fall is always a matter for concern. The way he is dressed, whether he has a compass, his age and physical condition, and his knowledge of the area are of immediate concern to the district warden who is always the first called and will put into action established plans for enlarging the search if necessary.

The lost person incident that ranks highest in priority and concern, and moves the greatest amount of manpower and equipment, is the lost child. I have seen nearly half of the Warden Service moved in on the second day of a search for a lost child, and we wouldn't want it any other way. Most lost people will aid the search party by building a fire or firing signal shots, but a child will usually hide even if searchers are just a few feet away and calling his name. On the other hand, a child will hardly ever panic, as a lot of adults do. He just doesn't know where he is. More often than not, a child will climb, either up on a hummock or generally for high ground if he notices any.

An adult will quite often panic when darkness settles in. If he does, he has real problems, and this can be the turning point between survival and perhaps never being found at all. I know of one lost man who ran himself to death the first night out. He ran in circles in an area with roads on all sides, and at no point was he more than a mile from any road. Some lost people will not even notice planes overhead and will cross tote roads or even tarred roads and go right into the woods on the other side. Of course, these people have panicked and have no idea what they are doing; they have to be chased down and literally jumped on. Often, they do not even know their own names at this point, and some have been known to have suffered permanent mental damage from the ordeal. One man who had already been lost for three days, spent an additional 24 hours in the woods because he was so happy when the search party was within 200 feet of him that he didn't answer; he just prayed.

IN THE VAST majority of searches, conducted by the local warden, the lost person is located that night, or he comes out the next morning. If he isn't located within two hours after daylight and if weather permits, we call in the planes; the lost person is generally located soon and either given directions out or told to stay until someone comes after him. If he is not located, more men and equipment are moved in.

In the case of a lost child, we use a grid search system. Wardens lay out a predetermined pattern of twine or colored ribbon on a course laid out from maps. The crews of eight to twelve, usually all volunteers, with one warden, make a slow but thorough search on a straight line. In this operation, crew members do not go around anything — they go over or through it. This means brush piles...swamps...brooks. By doing this, we can work area after area, and the search can be widened systematically from the headquarters site. In the grid system, additional crews run lines crossing the others so that nothing can be missed. This is the most exhausting kind of searching that I know of.

Sometimes, we find absolutely no signs of the missing person. If after four or five days, there is

still no evidence, some crews are assigned to go over ground already covered. This is usually carried out by an all-warden group, and then we know from our own experience that the area is clean. At this point, some searchers are out several miles from the search center, in less concentration, hoping to find a track of the person in case he went a lot farther than first suspected. If after ten or twelve days, we have found no evidence of the person, the search is usually terminated and a periodic check of the area is made.

We have found that we cannot depend on what a lost person might be expected to do. The will to survive is the dominant factor, and I have seen an elderly man who walked with two canes and who — according to those who knew him, couldn't go more than a hundred yards — travel well over a mile. Three-year-olds have been found six miles from the point where they entered the woods and still in good condition.

THE OFFICERS in charge of the search often have pressures on them that the casual observer never knows of. These are usually brought about by the handful of "Experts on Everything" that show up at any large-scale undertaking of this type. They seldom get more than 50 feet from their cars — if they get out at all! One example that I know of was on a large search where such a person drove out to the search headquarters, noticed six wardens resting on the ground, then rushed back to town to make some phone calls and start some derogatory stories going around. Had he bothered to ask, he would have found out that the crew was back for food and reassignment to a new grid area. But all he saw was a six-man crew apparently not doing anything. He couldn't see the other 40 wardens and sheriffs with more than 500 volunteers in the woods because he hadn't gotten out of his car.

Then there is the Rumor-Spreader. The most cruel of all is the one that starts the rumor that the person has been found when, in reality, not even a trace has been discovered. This happens quite often, and you can well imagine the feelings of the family of the missing person. I don't know what satisfaction he gets from this sort of activity. After a while, rumor-spreaders tire of their unwelcome activities and fade out of sight.

By contrast, the number-one aid to any search is the volunteer. He willingly drops his regular pursuits and gives of his time and energy to try to help find a person he doesn't know and usually has never heard of.

The Warden Service is also aided by State Police, sheriffs, local law enforcement officers, and other state departments. Search and rescue units from the military installations are especially useful, as are organized search and rescue clubs throughout the state. Fairly new on the scene are the rescue teams of the many Maine snowmobile clubs. They are well organized and well equipped. Besides the various mechanical aids, such as two-way radios and fixed wing aircraft, the Fish and Game Department now has two helicopters which have already proved their worth.

THE TREMENDOUS GROWTH in year-round outdoor activity and the increase in mechanical conveyances are putting more and more people into the woods. When one fails to return, the Warden Service is prepared to find him.

No obstacle prevents a thorough search when a lost person's life is at stake.

THE STATE BOARD OF PESTICIDE CONTROL

The History and Functions of Maine's Pesticide Regulatory Agency

IN 1965, the 102nd Maine Legislature, by its enactment of Chapter 447, Public Law, created a new state agency known as the State Board of Pesticides Control. Probably most sportsmen took little note of the birth of this department, but it was invested with responsibilities having a strong bearing on the well-being of many wildlife species and on the environment in general.

The statute specified that the Pesticide Board was to be composed of eight department heads, i.e., the commissioners of Inland Fisheries and Game, Sea and Shore Fisheries, Agriculture, Forestry, and Health and Welfare, and the chairmen of the Highway, Public Utilities, and the then Water Improvement (now Environmental Improvement) commissions; the law also stated that these department heads could appoint delegates to serve in their absence.

Maine Dept. of Agriculture Photo

Assuring the careful use of pesticides by commercial applicators is one of the primary functions of the Pesticide Control Board.

The Legislature's charge to the Board was a broad one; it was "to regulate, in the public interests, the application of pesticides." To help in accomplishing this rather formidable task, the Board was "authorized to employ necessary personnel," but no funds were appropriated for the purpose or, indeed, for any other! Nevertheless, the department heads set about their job, and on November 30, 1965, held a public hearing for the purpose of accepting testimony on the promulgation of regulations to govern pesticide applications in the state.

Following the hearing, a rather comprehensive set of rules was developed, which became effective on April 1, 1966. The new regulations provided for examination and licensing of custom pesticide applicators (those who apply pesticides for a fee); required licensed applicators to file proof of liability insurance and complete reports of all pesticide applications; contained provisions for the safety of custom applicators, their employees, and private individuals; and required any pesticide used to be registered, for that use, by the Maine Department of Agriculture. Other provisions dealt with disposal of excess pesticides and empty containers, prohibited the placement of spraying machinery in waterways during filling and other operations, placed limitations on height of roadside brush that could be sprayed, and provided some coverage in a number of other areas.

SO, FOR THE FIRST TIME, Maine had a set of pesticide application regulations; they were aimed primarily toward the custom applicator but also gave some guidance to the individual user of pesticides. Promulgation of regulations was, however, but one responsibility of the Pesticide Board. In addition, it was responsible by statute for designating critical areas where pesticide use might have to be curtailed, for restricting or prohibiting the use of certain chemicals when necessary, and for identifying and restricting hazardous pesticide practices.

The difficulties of performing these tasks with no staff and no operating budget except for a few hundred dollars of license revenue each year are obvious. Still, progress was made. Administration, examinations,

By Donald F. Mairs
Supervisor, Pesticide Programs

and licensing were largely carried out by Department of Agriculture staffers, and investigation of complaints was done primarily by Fish and Game biologists and Agriculture inspectors, with the other departments assisting as they were able.

A number of public hearings were held in response to indications of environmental damage. In one case involving aerial spraying of a northern community for control of biting flies, the Board ruled that the evidence did not warrant a prohibition of spraying but recommended that an alternate material be used rather than DDT. Later that year (1966), the Board prohibited further use of DDT within 500 feet of Worthley Pond in Peru; this judgment was based largely on evidence presented by the Fish and Game Department to the effect that fish populations in the pond had been reduced due to DDT usage. In August 1968, a hearing was held on a proposal to ban use of DDT in Dutch elm disease control programs; there was no opposition to such action, and the ban — one of the first of its kind in the country — was voted.

Meanwhile, an attempt to obtain operating funds from the 103rd Legislature had failed. In 1969, though, a small appropriation was voted by the 104th, allowing the Board to employ a program supervisor and a secretary and providing money for office equipment and travel expenses. The same Legislature revised the basic statute somewhat, making it clear that *all* outdoor pesticide applications in the state, by private as well as professional applicators, were to be considered under the Board's authority. Another revision made at that time expanded the Legislature's charge to the Board, changing it to read as follows:

"For the purpose of assuring to the public the benefits to be derived from the safe, scientific and proper use of chemical pesticides while safeguarding the public health, safety and welfare, and for the further purpose of protecting the public interest in the soils, water, forests, wildlife, agricultural and other natural resources of the state, it is declared to be the policy of the State of Maine to regulate the sale and application of chemical insecticides, fungicides, herbicides and other chemical pesticides." This rather comprehensive "preamble" represents the Board's present operational philosophy, so far as budgetary limitations permit.

With the employment of staff, the Board's activities have accelerated somewhat over the past two years. In 1970, DDT, DDD, aldrin, dieldrin, heptachlor, and toxaphene were classified as restricted-use pesticides, the outdoor use of which should be preceded by permission from the Board. The use of benzene hexachloride (including lindane) for biting fly control was prohibited at the same time. In 1971, the regulations were revised and expanded; included are provisions requiring Board approval before any pesticide is applied to public waters, providing that municipal crews applying pesticides must be supervised by a licensed applicator, and updating the sections on disposal of surplus pesticides and empty containers.

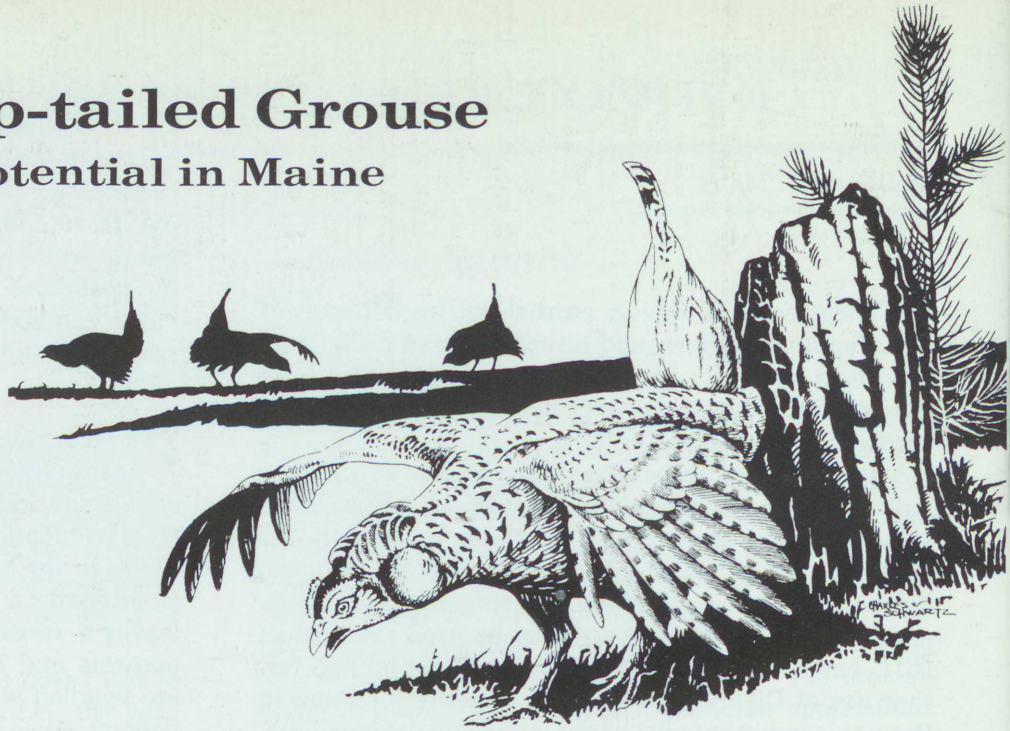
PROBABLY the single most time-consuming task at the Board office is that of answering questions on pesticide usage and effects. Requests for specific pesticide *recommendations* are referred to the University of Maine or the Maine Forestry Department, as the Board is primarily a regulatory agency; this, however, still leaves a tremendous number of questions about use patterns and environmental effects. These questions are handled individually, by letter, phone, or personal contact. Some complaints of improper pesticide use are received each year, and these must be carefully investigated, often in co-operation with other agencies.

Licensing and checking of pesticide application reports require considerable effort from early spring until snow flies. In 1971, there were 57 licensed custom applicators in Maine, and some of them made hundreds of spray applications. Keeping abreast of current developments in pesticide ecology and technology is practically a full-time job in itself, with many journals to be reviewed and attendance at some meetings and workshops a virtual necessity.

Field work is also vital although the office workload is frequently such that field activities must be curtailed to an undesirable extent. During the summer months of 1970, about one-third of the supervisor's time was spent in the field contacting and observing the operations of custom applicators and commercial growers. The amount of time spent in the field should be increased, but it is difficult to see how this can be done with present staff limitations.

It is hoped that this brief article will place in perspective for **Maine Fish and Game** readers some of the activities of the Pesticides Control Board. Sportsmen were among the first real "environmentalists," and their interest and support are as vital now as they were in the days before ecology became a widely fashionable science. Much of the biological data now used in assessing the impact of pesticides upon the environment were generated by studies of the U.S. Fish and Wildlife Service and state conservation agencies. Hunters and fishermen contribute to the support of these agencies both indirectly and directly, and it is also to be hoped that these same sportsmen will, as individuals, do their part to help us see that pesticides are used carefully, to provide for maximum benefits to mankind and minimum damage to the environment of which all of us are a part. ■

The Sharp-tailed Grouse
and its potential in Maine



By Douglas L. Marston
Game Biologist

IN THE mid 1950's, the Department gave consideration to the possible introduction of an exotic game bird, the sharp-tailed grouse. After intensive habitat investigations by the Department's game biologists, 38 birds were eventually obtained from North Dakota and released in Township 30, M.D., Washington County, in February 1957. In 1959, an additional 17 birds, obtained from Nebraska, were released in the same township during February and March. The last release of sharp-tails in Maine consisted of 15 on March 18, 1960. The last confirmed observation of these birds was by personnel of the Deblois fish hatchery in Township 18, M.D., May 1, 1961 — more than one year after the last release. There were two unconfirmed observations reported to the Department in 1971.

It might be asked why the Department of Inland Fisheries and Game ever considered the release of such an exotic game bird in the State of Maine. It was obvious that a large area of our state consisted of habitat that had been so altered by man that it no longer supported reasonable populations of our native game bird, the ruffed grouse, or as it is more commonly known, the partridge. These altered areas consisted of farmlands and large areas of burned-over lands being managed for blueberry production.

While our submarginal farmlands were gradually reverting back to woodlands, it appeared that our blueberry barrens would be with us for many more years. Investigations indicated that these blueberry barrens provided a distinct habitat type similar to that occupied by the sharp-tailed grouse in the Great Lakes area and particularly Minnesota and Wisconsin. Unfortunately, the Department was unable to obtain birds from the Great Lakes area and accepted what birds could be obtained from the plains areas of North Dakota and Nebraska.

The adult feeding habits of the sharp-tailed grouse appear to be similar to our native ruffed grouse, but the feeding habits of the young chicks differ significantly. Ruffed grouse chicks feed on insects for only the first two weeks of their life, while sharp-tails feed on insects for approximately ten weeks. Habitat preferences for the young birds also differ, with ruffed grouse seeking alder runs or brushland, while sharp-tailed grouse chicks seek more open land.

Another major consideration when contemplating the introduction of exotics is the possible competition that may occur between them and our native species — in this instance, the ruffed grouse. From what we can learn of the sharp-tail's habitat preferences in the lake states, an area also containing ruffed grouse, we find that although the two species of birds have similar winter feeding habits, the sharp-tail is generally associated with the edges of open areas. The ruffed grouse, in comparison, is associated with older forest stands adjacent to overgrown farmlands or young, cut-over woodlands.

Perhaps one of the major problems associated with the successful establishment of an exotic species in a new area is the nature of the habitat into which the birds are first introduced. Obviously, the new habitat must match the habitat from which the birds were taken. This factor undoubtedly resulted in the rapid dispersement of the sharp-tails after our earlier releases.

Other factors conducive to successful establishment include liberating healthy, vigorous birds, and releasing sufficient numbers to ensure a breeding potential for the future. It is my opinion that a potential for sharp-tails exists in eastern Maine; however, the successful establishment of these birds in our state would require strict compliance with the guidelines listed above and a certain amount of good luck. ■

WATER BANK PROGRAM

Saving Our Marshland Areas

By Dave Dexter

MAINE IS IN THE PROCESS of taking part in a new 1972 Water Bank Program. Congress has allotted $10 million to this 10-year program which is designed to preserve and improve wetlands for migratory waterfowl habitat throughout the country.

Although 3,000 counties were considered, only 56 counties in 13 states were chosen.

A national advisory board was selected earlier this year, and Maine is represented on this group by State Representative Minnette Cummings of Newport.

The Game Division's wetlands inventory data, stored in the Department's Maine Information Display Analysis System (MIDAS) which was processed by the Planning Division, provided the sound scientific basis by which Kennebec County was chosen.

The program has nine points under its stated purpose. They include conservation of surface waters, protection of migratory waterfowl habitat and enhancement of natural beauty, reduction of acreage of new land coming into production and retirement of lands now in production, and promotion of comprehensive water management planning.

The program is being implemented in Maine by the office of the Kennebec County Agricultural Stabilization and Conservation Service. It comes under the U.S. Department of Agriculture.

A person owning land or operating land in the county for at least two years was eligible to sign up for a minimum of 10 acres. Following submission of the applications, they were reviewed by the County ASCS Committee, personnel of the Fish and Game Department, and the Department of the Interior before final assignments were made.

Another $10 million had been requested for 1973 to provide additional 10-year agreements, and it's hoped that other Maine counties may qualify to take part in this program which holds exciting promise for the management practices of the Game Division. The Department has been encouraging the acquisition of marsh areas throughout the state for just this purpose.

THE RATE OF PAYMENT is scheduled to be $5.00 per acre for types 3, 4, and 5 classified wetlands; $5.00 for types 1 and 2 wetlands; and $10.00 for all other adjacent land. It was necessary to have at least two acres of type 3, 4, or 5 to qualify with the remaining acreage made up of other types to make up the minimum amount. A total of about 6,200 acres has been approved. This represents some 90 plus people. There was no maximum acreage set except that adjacent land could not exceed four times the acreage of the three primary types. Large blocks received priority.

Obligations of those signing up include the following: they will not drain, burn, fill, or otherwise destroy the wetland character and the waterfowl value of the area; they will not use any of the designated area for cultivated crop production, haying, or grazing, nor use any of the water for irrigation, nor allow the use of large outboard motors on the area, especially during nesting.

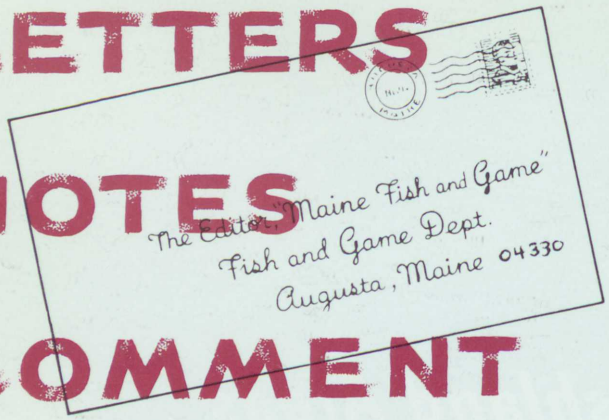
The Department is also encouraged by the fact that these areas, if not posted to hunting during the past two years, cannot be posted more restrictively than "no hunting without written permission."

The wetlands classifications are: Type 1, seasonally flooded basins or flats; 2, fresh meadows; 3, shallow fresh marshes-inland; 4, deep fresh marshes-inland; and 5, open fresh water-inland.

Following the filing of requests, the farm boundaries were delineated on an aerial photo by the Soil Conservation Service. After the assignments were made, the requests were turned over to the SCS to determine actual boundaries, the acreage of types 3, 4, and 5 wetlands, and what conservation measures were required.

It has also been pointed out that land owners may be eligible to take advantage of the Rural Environmental Assistance Program (REAP), which is designed to help farmers and ranchers prevent or abate agriculture-related pollution of water, land, and air; and to conserve agricultural soil, water, woodland and other wildlife resources. REAP is a successor to the Agricultural Conservation Program. ■

LETTERS NOTES COMMENT



Letters of general interest are welcomed. They should be signed, but initials will be used on request.

RALPH C. WILL NAMED NEW BUSINESS MANAGER

Ralph C. Will has been named business manager of the Maine Fish and Game Department. He succeeds the late C. Keith Miller.

Will, a native of St. Louis, Mo., has been acting in this capacity for several months. He resides in Winthrop with his wife, the former Sue Ann Fechtner of Wausau, Wis., and their three children.

He attended high school in Woodstock, Ill., earned a B.S. degree from the University of Wisconsin School of Agriculture, majoring in agricultural engineering, a master's degree in business administration from the school of commerce, and was granted a B.B. N.A. from the University's School of Commerce.

Prior to joining the Fish and Game Department, Will was with the Madison Gas and Electric Co., Madison, Wisc., the Public Service Commission of Wisconsin, the Central Maine Power Co., in Augusta, and the Lewiston Machine Co., of Lewiston. Will, 36, is a member of the Winthrop Lions Club.

SPECIAL AWARD

A beautiful book called *Sport Fishing USA* has been given the top award as the best hardback popular or technical federal publication issued in 1971. The award was made by the Federal Editors Association, with the presentation made by Senator Charles Mathias of Maryland. Accepting on behalf of the Bureau of Sport Fisheries and Wildlife, Department of the Interior, was Dan Saults, managing editor of the book. Other editorial staff members are Michael Walker, editor; Bob Hines, illustrator; and Rex Gary Schmidt, photo editor.

An excellent presentation of sport fishing, the book is made up of contributions from numerous writers and photographers from across the nation, including several from Maine. Running 464 pages and carrying plenty of illustrations, many in color, *Sport Fishing USA* is available at $10 a copy from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

INSPECTOR NAMED; ONE REASSIGNED

The Maine Fish and Game Department has promoted one warden to inspector and reassigned another inspector, according to Chief Warden William J. Shaw.

Warden Inspector Russell E. Dyer of Enfield has been transferred from Division G and will take over duties in that capacity in Division A under Warden Supervisor Charles B. Lombard.

Eric T. Wight of Rumford has been promoted to inspector and will take over duties in Division G under Warden Supervisor E. Leonard Ritchie.

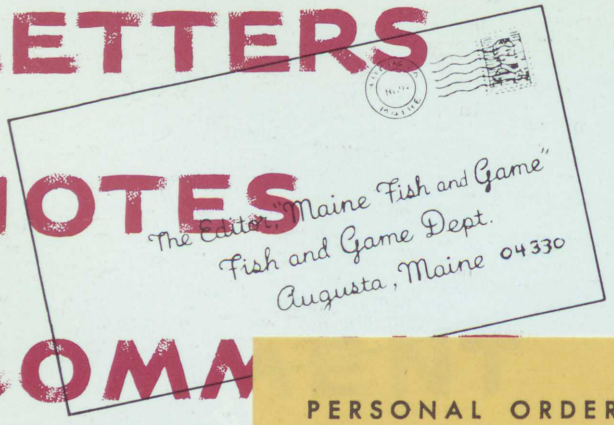
Dyer joined the Warden Service in June of 1961 and was promoted to inspector in 1971. He is a graduate of Freeport High School, attended Gorham State Teachers College, and served four years in the Marine Corps Reserve. He is married to the former Carole Abbott of Freeport, and they have three children. Dyer is a member of the Maine State Employees Association, Maine Law Enforcement Association, and is an honorary member of the Sebago Lake 31 Club.

Wight, 35, is a Lewiston native and is married to the former Karen Anne Perkins of Kittery. They have one son. Wight was graduated from Gould Academy, Bethel, in 1959 and served in the National Guard.

While at Gould, Wight attended summer school at the Daniels School of Forestry, Rutland, Mass., and after graduation studied forestry for a semester at Nichols College in Dudley, Mass.

Wight is a member of the Warden Service rescue team. Prior to joining the Department, he was a watchman on Old Spec Mountain in Grafton Notch.

LETTERS NOTES COMM



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"BUILDERS BY NATURE" NEW BEAVER FILM

After about five months of actual effort over a two-year span, the Maine Department of Inland Fisheries and Game has produced a beaver film entitled "Builders by Nature."

This extremely colorful and informative picture story on the life and activity of the beaver was produced by Bill Cross, audio-visual specialist for the Department. The script was written by Robert W. Boettger, assistant chief of the Game Division, and W. C. Mincher, chief of the Information and Education Division. Mincher narrates the film.

Although the 22-minute film deals primarily with the activity of the beaver, Cross has also caught with his camera other wildlife of Maine throughout the four seasons.

Cross gives credit for much assistance in the film making to Myron Smart of Milo, a retired game biologist technician who is recognized as an outstanding authority on the beaver.

The film is available for public showing through the Audio Visual Center at the University of Maine-Orono. The booking fee is $1.25 per film per showing, until September 1972, when it will change to $2.00.

SUBSCRIPTION EXPIRING?

Don't take a chance on missing a single issue of **Maine Fish and Game**—check to see when your subscription expires.

If you see LAST COPY printed on your mailing label, the current subscription has run out.

The last two digits on the top line of the label code indicate your last issue — 32, for example, stands for the 2nd (spring) issue of 1973.

MUNICIPALITIES GET SNOWMOBILE MONEY

The Maine Fish and Game Department's snowmobile registration office has completed distribution of $301,506 to various towns and cities throughout the state.

Under Maine's snowmobile law, $6 from each $10 registration fee goes to the municipality from which the registration was received. Although this money can be used in any manner seen fit by the municipality, some have earmarked funds for specific snowmobile projects.

Penobscot County was tops, receiving $50,652, followed by Aroostook with $39,132, and Kennebec with $33,774. The other counties, in order, received the following: Cumberland, $30,492; York, $21,492; Androscoggin, $20,700; Somerset, $19,896; Oxford, $19,680; Hancock, $12,426; Franklin, $11,334; Washington, $10,860; Piscataquis, $10,056; Waldo, $7,290; Lincoln, $5,166; Knox, $4,824; and Sagadahoc, $3,732.

CHRISTIE TAKES NEW POSITION

Donald K. Christie, director of the planning division, left the Department early in July to join the Department of Education. In his new position, Christie will be one of four co-ordinators administering some $6 million in federal grants for elementary education.

Christie first joined the Fish and Game Department in 1961 as a warden aide, then briefly as a warden. In 1964 he took over as supervisor of conservation education, a post he held until going with the Planning Division.

Christie, 38, is a native of Portland, was educated in schools there and was graduated from Deering High School in 1954. He earned a degree in education from the then Gorham State Teachers College in 1958. He has since gained graduate credits at the University of Maine-Orono, in administration, and Miami University of Ohio, on a National Science Foundation grant in Botany and is currently finishing work toward a master of science degree in science education.

He served three years in the U.S. Army and was a special agent in Counter Intelligence.

Christie is married to the former Ann M. Feehan of Portland. He is a member of the National Education Foundation, the Maine Teachers Association and the Maine Association of Science Teachers.

FROM OUR READERS

The Editor:

I would like to suggest that you might have an article on the proper way to handle a deer after it has been shot. I have become concerned over the condition that deer are being handled in, as hunters are losing a lot of good meat just from improper handling of their kill.

At the high cost of meat today it is too bad to have fine eating meat like venison spoiled through carelessness or lack of knowledge.

Earle C. Dutch
North Berwick, Maine

We have had in mind for quite a while an article on the proper way to handle a deer after it has been shot. Such an article is definitely scheduled for the fall issue of **Maine Fish and Game.**

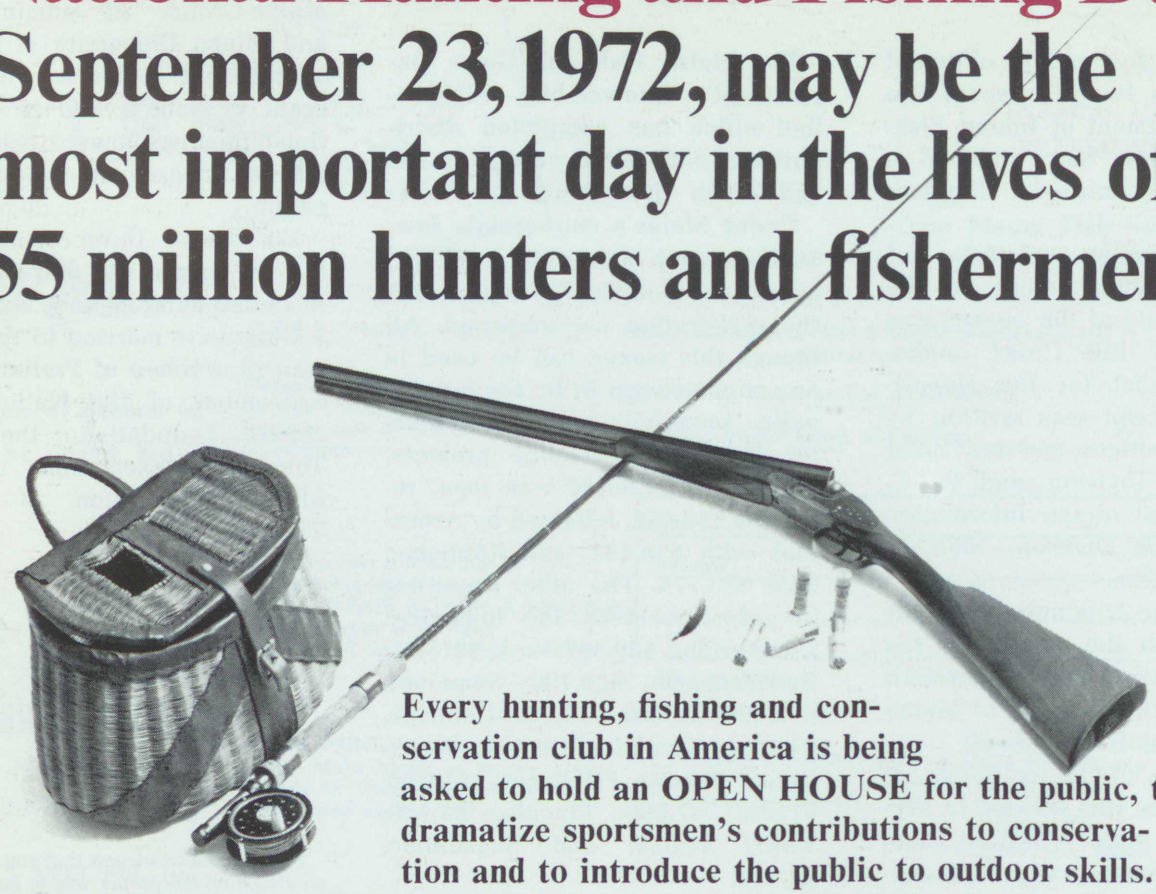
The Editor:

I am a bug on smallmouth bass. Two years ago our family switched (camps) to Belgrade Lakes (Great Pond)...but am disappointed with the fishing in one sense. There is no question about there being a lot of bass in many areas...but I am struck by the number of small and medium sized fish. Is it possible that the lake has too large a population of bass for the available feed, hence a gradual stunting is occurring? Would it be better to destroy what one catches for a year or two to thin it out? Or is it possible that a lot of us just haven't found the sanctuaries and migration routes of larger bass?

H. B. Putney
Wilmington, Delaware

The reason (for the smaller fish) probably is the bass tapeworm and its effects on reproduction, etc. We refer you to an article elsewhere in this issue on the subject of fish parasites and the bass tapeworm.

National Hunting and Fishing Day, September 23, 1972, may be the most important day in the lives of 55 million hunters and fishermen.



Every hunting, fishing and conservation club in America is being asked to hold an OPEN HOUSE for the public, to dramatize sportsmen's contributions to conservation and to introduce the public to outdoor skills.

National Hunting and Fishing Day officially recognizes the role of America's sportsmen in conservation and outdoor recreation. Resolutions now in Congress not only establish NHF Day, but ask hunters and anglers to lead the public in a rededication to the conservation and respectful use of our wildlife and natural resources. Your sportsmen's club should take the leadership in your community by holding an OPEN HOUSE which shows your friends and neighbors what sportsmen are doing for conservation . . . and have done for the past 70 years.

Open House can win new friends for conservation and introduce youngsters to shooting and fishing. No one can do more for hunting and fishing than you, working in your own community on a friendly person-to-person level with your neighbors and business associates. By helping your sportsmen's club organize an OPEN HOUSE, you could show exhibits and movies about the sportsman's outstanding contributions to conservation to many new people. You and your club can set up skill centers for young people and their parents to participate in shooting, archery, casting and camping . . . really show them what goes on at a sportsman's club and how much fun it is. It's an ideal time to teach them that the American sportsman is the best friend fish and wildlife ever had. An OPEN HOUSE might also be used to raise funds for a conservation project with a turkey shoot or casting game. Civic leaders will be glad to provide valuable support, and you might well get a newspaper or broadcasting station to co-sponsor OPEN HOUSE. National Hunting and Fishing Day, along with state proclamations by all 50 governors, will help get publicity for your role as a sportsman in conservation. Imagine what will be done when clubs like yours hold successful OPEN HOUSES all over the country on National Hunting and Fishing Day!

You'll be supported by these important organizations:

National Wildlife Federation
Sport Fishing Institute
Wildlife Management Institute
Outdoor Writers Association of America
The Wildlife Society
American Fisheries Society
National Conservation Committee of Boy Scouts of America
National Rifle Association
American Fishing Tackle Manufacturers Association
National Shooting Sports Foundation
International Association of Game, Fish and Conservation Commissioners
Izaak Walton League of America
National Sporting Goods Association
Keep America Beautiful, Inc.

Send for a complete Open House Action Manual, with everything planned for you in advance. Contents include complete, step-by-step plans for:

- What activities to present.
- How to get publicity.
- How to organize OPEN HOUSE.
- Where to obtain displays and literature.
- How to get VIP's.
- . . . and more.

Conservation needs more friends. Tell some of yours all about it on National Hunting and Fishing Day. Use the coupon below to obtain your copy of the OPEN HOUSE Action Manual.

Enclosed is $1.00. Please send your Open House Action Manual that tells me how my club can tie in with National Hunting and Fishing Day, September 23, 1972.

Name_____

Club Name_____

Address_____

City_____ **State**_____ **Zip**_____

TO: NATIONAL SHOOTING SPORTS FOUNDATION, INC.
1075 POST ROAD, RIVERSIDE, CONNECTICUT 06878

NATIONAL SHOOTING SPORTS FOUNDATION INC.

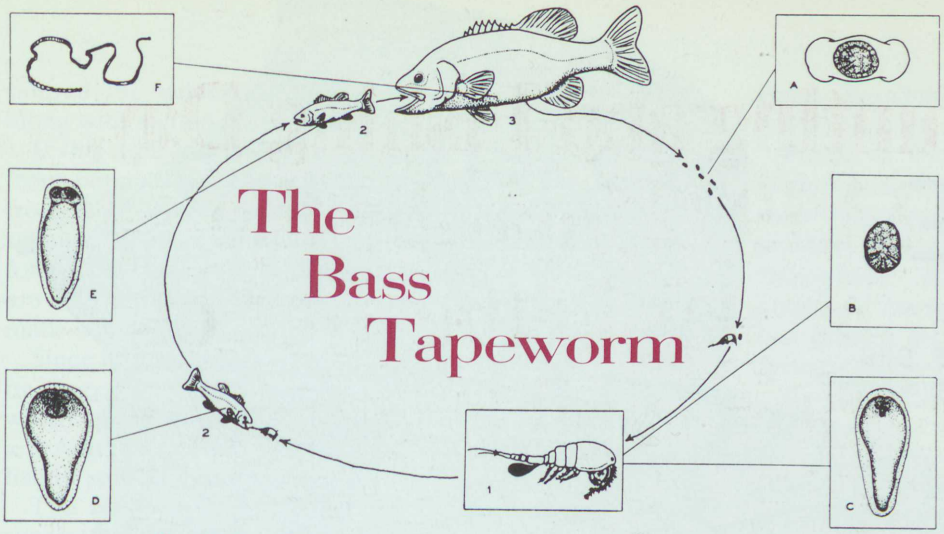


Figure 1. Life cycle of the bass tapeworm as described in text.

The Bass Tapeworm

By Urban D. Pierce, Jr.
Fishery Biologist

THE BASS tapeworm, *Proteocephalus ambloplitis*, is one of the most serious parasites infesting Maine's smallmouth bass populations. It is believed to have been brought into the state originally with the introductions of bass about 1869.

Every stage of this serious parasite is harmful. The adult tapeworm absorbs much nourishment from the fish, and one of the immature stages damages the reproductive organs and other tissues. Nearly all species of fish in Maine waters can become infested. It is, however, most common in bass, sunfish, crappies, white and yellow perch, and some minnow species, largely because of their feeding habits.

The life cycle of the bass tapeworm is rather complicated (Figure 1). The adult tapeworm (F) is found in the digestive tract of the bass. The adult worm produces large numbers of eggs (A) that are passed from the bass with the feces. Once in the water, the eggs may be eaten by tiny animals known as crustaceans (1), which are the first host of the bass tapeworm. Eggs not eaten by these animals within 36-48 hours will die.

Once the eggs have entered the crustacean, they develop into the first larval stage (B) or immature form of the adult worm. When the first immature stage enters the intestine of the crustacean, it bores through the intestinal wall into the body cavity where it develops into the second immature stage (C).

For the life cycle of the bass tapeworm to continue, the crustacean must be eaten by a fish (2) which becomes the second host. When the crustacean is digested in the stomach of the fish, the second immature stage passes through the intestinal wall of the fish and escapes into the body cavity where it develops into the third immature stage (D and E).

It is the third stage that causes the greatest problems for the bass. Once the infestation has started, it causes much damage to the body tissues. The liver, spleen, and reproductive organs are the most seriously affected; the tissues may become soft, flabby, or jelly-like. It is not uncommon for a bass to be completely sterile because of the severe damage done to the reproductive organs. Consequently, many of our once thriving bass populations have been reduced drastically in numbers due to the lack of reproduction and increased mortality. This is the stage of the bass tapeworm that is most often noticed by fishermen and makes the bass unappealing for food even though the eating quality of the fish is not affected and there is no danger to humans.

When a small bass or other fish infested with the third immature stage is eaten by a larger bass, the larger bass serves as the final host (3). The third stage develops, within the intestine of the final host, into the adult bass tapeworm (F), and the normal cycle is complete.

Typical appearance of the internal organs of a tapeworm-infested bass.

WHAT CAN be done to remedy the problems caused by the bass tapeworm? Unfortunately, there were no restrictions and inspections of fish for parasites and diseases in 1869 as there are now. If there had been, the bass tapeworm would probably never have reached Maine.

The only means of introduction is by introducing either infested fish or infested crustaceans. Illegal introductions of bass and other fish must be absolutely curtailed, and anglers must be extra careful about the bait they use when fishing. Every precaution must be taken not to introduce infested bass into new waters. If an angler wishes bass to be introduced in a lake, he should contact the nearest regional fishery biologist of the Maine Fish and Game Department.

The bass tapeworm cannot be eliminated from those waters that already have this parasite, but it can be prevented from spreading to other lakes. The utmost co-operation between anglers, bait dealers, and the Fish and Game Department is imperative if the spread of this harmful parasite is to be controlled. ■

Maine's Fishery Regions:

BELGRADE

By Charles F. Ritzi
Regional Fishery Biologist

YOU DON'T have to go far in any part of Maine to be out in the country and on good fishing waters — many of the largest fish in the bass, brown trout, and pickerel categories of "The One That Didn't Get Away Club" are consistently taken within a dozen miles of the State House dome.

The capitol city of Augusta is the headquarters of our Belgrade Fishery Region. To set the regional boundaries, start at Brunswick on the coast and follow the Atlantic shoreline northeast to Searsport, then up the Penobscot River to Bangor, then northerly, westerly, and southerly along a rough line through the towns of Corinth, Dexter, Harmony, Skowhegan, and Smithfield to the Androscoggin River at Livermore Falls, and down the Androscoggin to Brunswick. This is a land area of about 5,000 square miles including all of the counties of Sagadahoc, Lincoln, Knox, Waldo, and Kennebec and parts of Androscoggin, Somerset, and Penobscot counties. The approximately 250 lakes add up to nearly 100,000 acres of water.

Major river drainages are the Androscoggin, Kennebec, and Penobscot; and the largest tributaries of these big rivers are the Sabattus, Sebasticook, Eastern, and Cathance rivers and Cobbosseecontee, Marsh, and Souadabascook streams. The largest coastal drainages are the Sheepscot, Damariscotta, Pemaquid, Medomak, St. George, and Passagassawakeag rivers.

Variety is the best word to describe fishing in the Belgrade Region. Nearly every lake contains bass, pickerel, and perch, and the region is best known for these species. But we have pretty good fishing for what are usually con-

sidered the wilderness Maine fish—salmon and togue, along with a good portion of the state's brown trout.

If this area has a fishery weakness, it lies in its brook trout populations. Brookies do not tolerate competition from other species, and almost all waters have numerous species. Summer water temperatures reach critical levels for brook trout in many waters in southern Maine. We are able to manage for brook trout only when we can eliminate competition; we do this by chemical reclamation.

Since this is a coastal region, our streams are frequented by several species of anadromous fish. These are species which spawn in fresh water but live in the sea or estuaries. Atlantic salmon, striped bass, and smelt are popular fish in several coastal drainages.

The simplest way to cover the Belgrade fishing is to suggest some popular waters for each species:

Smallmouth bass. This is the most sought-after fish in this region. It is most abundant in lakes with rocky islands, shoals, and shorelines, and water depths of at least 25-30 feet.

The general fishing season is June 21 through September 30, but there is a special, single-pointed-hooked artificial lure season from June 1 through June 20. This early season coincides with the spawning season, and fishing is often fast when the bass are on their nests.

Kennebec County has the bulk of our best smallmouth waters. These include the Belgrade chain of lakes, China Lake, Cobbosseecontee Lake, David Pond, Maranacook Lake, Parker Pond, and Torsey Pond.

Fish and Hobbs ponds in Knox County, Damariscotta Lake and Webber Pond in Lincoln County, Nokomis Pond in Penobscot County, and Great Moose Pond in Somerset County are all good. Waldo County has Coleman Pond, St. George Lake, Sheepscot Lake, and Swan Lake.

Largemouth Bass. The largemouth, well distributed in this region, prefers shallow, muddy-bottomed, weedy waters. This species grows quite large in good habitat, and fish over five pounds are not uncommon. Fishing season is the same as for smallmouths.

Probably the best largemouth fishing in the state is found in Cobbosseecontee Lake, Cobbosseecontee Stream, and Pleasant Pond in Kennebec County. Elsewhere in this same county, favorite spots are Belgrade Stream, David Pond, Hutchinson Pond, Little Cobbosseecontee Pond, Moose Pond, Mosher Pond, Nehumkeag Pond, Taylor Pond, and Threecornered Pond.

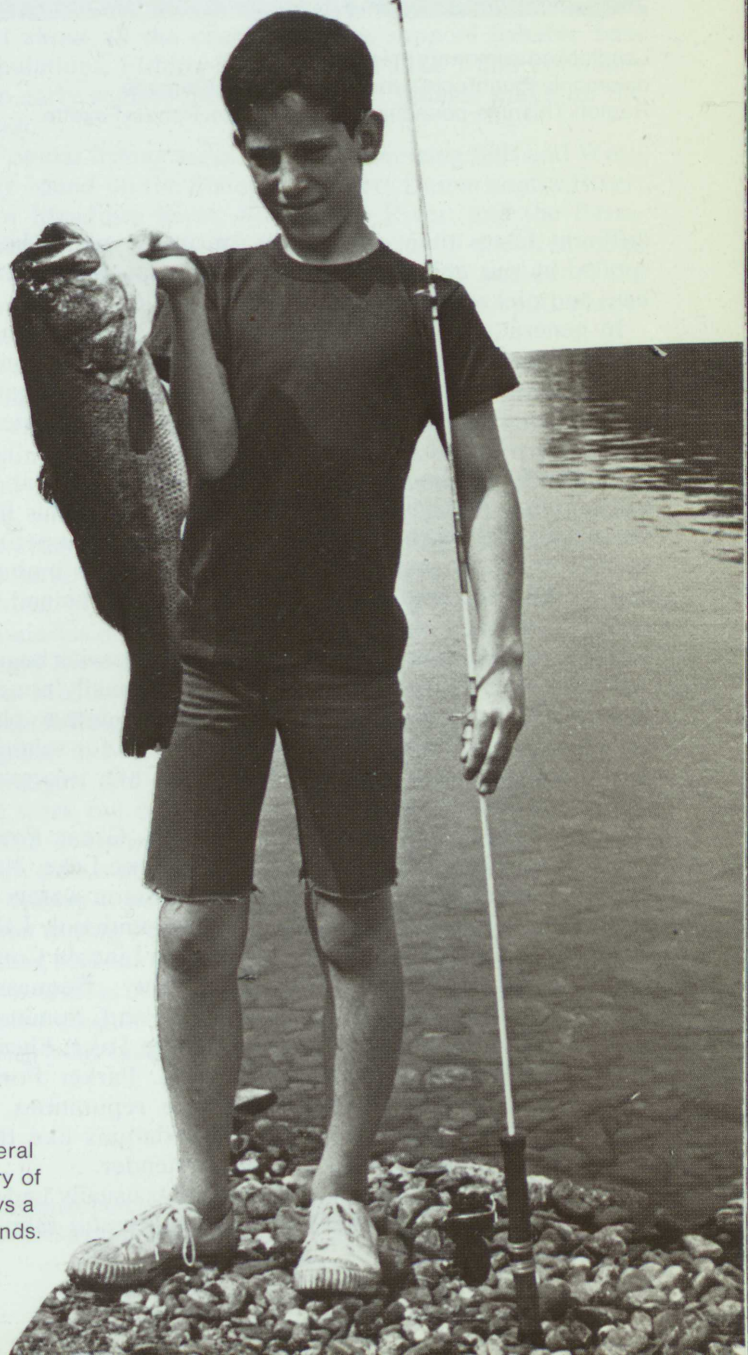
Lily Pond and Sidensparker Pond in Lincoln County, Center Pond in Sagadahoc County, and Waldo County's Cargill Pond and Sandy Pond fill out the largemouth suggestions.

Pickerel. Just about every lake and pond in the region has some pretty good pickerel fishing, and recommending any is a sort of formality. A good geographical spread would be Androscoggin Lake, Androscoggin County; Cobbosseecontee Lake, Kennebec County; Clary Lake and Dyer Long Pond in Lincoln County; Winnegance Pond, Sagadahoc County; and Quantabacook Lake in Waldo County.

Perch. In Maine, perch means white perch, and many anglers hold that this fish is the best eating of all our freshwater varieties. They are a usual companion of bass and pickerel and are especially popular when they reach "humpback" size of about one pound. Some waters are known as "humpback" producers, but even those that are not, provide big enough fish for both sport and food. The spring spawning runs provide a lot of early season fishing.

As with pickerel, we'll give you a few lakes for starters, and the rest is up to you. Try Androscoggin Lake again, Great Pond and Narrows Pond in Kennebec County, Damariscotta Lake in Lincoln County, Wassookeag Lake in Penobscot County, and Quantabacook Lake in Waldo County.

We don't mean to imply that the yellow perch isn't worth mentioning, and we realize that non-Mainers have



The Belgrade Fishery Region has several outstanding largemouth bass waters. Todd Curry of Guilford, Connecticut, proudly displays a Cobbosseecontee Lake largemouth that weighed over eight pounds.

Landlocked salmon are the most commonly sought cold-water species in the Belgrade Region. This nine-pounder came from Parker Pond in Fayette.

different tastes than our natives; probably we've been spoiled by our abundance of cold-water species and our bass and pickerel fishing.

In general, really attractive yellow perch, 12-14 inch fish, are not common in our waters, and this species seems to be dominated by white perch where they occur together. But they're certainly not scarce in weedy, warm waters, and those who like them won't be disappointed.

Landlocked salmon. Salmon are the most popular of our regional cold-water species. Management of this fish is complicated by the presence of numerous competitor species in all our ponds. Natural reproduction is limited, and all Belgrade Region salmon waters are maintained by stocking.

The open water season on all cold-water species begins April 1 and ends September 30. The ice is usually not off most ponds by April 1, but late April is a safe date to plan on. May and June are the best fishing months for salmon; more patience and different technique are necessary during the summer months.

China Lake, Echo Lake, Flying Pond, Great Pond, Long Pond, Maranacook Lake, Messalonskee Lake, Narrows Pond, and Parker Pond are good salmon waters in Kennebec County; Alford Lake and Megunticook Lake are in Knox County; Damariscotta Lake, in Lincoln County; Wassookeag Lake, Penobscot County; Nequasset Lake, Sagadahoc County; Great Moose Pond, Somerset County; and in Waldo County, St. George Lake, Sheepscot Lake, Swan Lake, and Unity Pond. Parker Pond, Swan Lake, and St. George Lake have reputations as "big fish" lakes, but making recommendations like this is usually risky business for the recommender.

Brown trout. Brown trout management is usually undertaken when a lake is not suitable for successful salmon management. Heavy competition, marginal water quality, and small total acreage are common features of brown trout waters. As with salmon, annual stocking maintains most of these fisheries.

Our most productive brown trout waters are Cochnewagon Pond, McGrath Pond, Salmon Lake, Tacoma lakes, Webber Pond, and Wilson Pond in Kennebec County; Chickawaukie Pond, Crawford Pond, Crystal Pond, and Hobbs Pond in Knox County; Biscay Pond, Kalers Pond, Knickerbocker Pond, and Little Medomak Pond in Lincoln County; Lake George and Oaks Pond in Somerset County; and Dutton Pond and Sanborn Pond in Waldo County.

China Lake in Kennebec County, Great Moose Pond in Somerset County, and Sheepscot Lake in Waldo County are not stocked but have some natural reproduction — these ponds are most likely to give up really large browns.

Togue (lake trout). Togue require a considerable volume of cold, well oxygenated water. These criteria are not met in many southern Maine waters, and our management for togue is limited by this factor. All our togue waters in the Belgrade Region also have salmon, and a few have browns, so that the possibilities of a mixed bag are interesting.

China Lake, Echo Lake, Flying Pond, Minnehonk Lake, and Narrows Pond in Kennebec County; Wassookeag Lake in Penobscot County; and Sheepscot Lake in Waldo County are our togue waters.

Brook trout. As already mentioned, almost all the brook trout ponds in the Belgrade region are the result of chemical reclamation which removes competing species. Each year, a few really large brookies are taken from lakes like Great Pond and Messalonskee Lake of the Belgrade chain, but these are the result of limited natural reproduction and not any management by stocking. We can manage for trout in quantity only in our smaller waters and then usually only by the intensive technique of reclamation.

Fishable populations of brook trout are found in Kennebec County in Basin Pond, Kimball Pond, Chamberlain Pond, and Desert Pond; Long Pond is on Isle Au Haut in Knox County; Lincoln County offers Peters Pond, Ross Pond, and Wiley Pond; in Somerset County, try Ripley Pond; Halfmoon Pond (Brooks Township), Halfmoon Pond (Searsport Township), and Mixer Pond are good bets in Waldo County.

Our brook trout ponds are fished quite hard in the spring but not very heavily later in the season. August and September fishing can be good, and the ponds won't be crowded. Most of these brook trout waters open to fishing later in the spring than other waters so check the regulation book before planning your trips.

Rainbow trout. Although rainbows are being managed in only one pond in the region, this experimental stocking has been quite popular and adds some variety to area angling.

Egypt Pond, Kennebec County, has been stocked with rainbows for several years and, for its size, has provided a great deal of angling enjoyment. The bulk of the fish caught are in the 10-14 inch class, but a number of 2-4 pounders are creeled along with them.

Smelt. Besides serving as the main forage fish for our salmon, trout, and togue populations, the smelt is much sought by two-legged predators. Dipping smelt from the spring spawning runs in brooks is a traditional Maine outing, and many people carry this sport into the summer months by hook and line angling in the deeper water of some of the larger lakes. Damariscotta Lake in Lincoln County and Long Pond and Messalonskee Lake in Kennebec County are popular spots for smelt angling.

Anadromous species. The Atlantic salmon is the elite of these fish which live in salt water and return to fresh-water to spawn, and the Sheepscot River is the southernmost stream in the United States with a fishable salmon population.

The Sheepscot population is a natural one, and we estimate the run of adult fish entering the river at 100 to 200. This is a relatively small river and is not as well known as the more northerly Maine rivers, but for those who take the time to learn the stream, the fish are there. Each year, fish in the 10-15 pound class are taken, but the size of the run is such that we would not expect more than an occasional really large fish.

The bulk of the anadromous fishery is centered around the striped bass. This fish is found in the Kennebec River to Augusta and moves up the Penobscot as far as Bangor. Just about all the coastal streams support fishable bass populations. Fishing begins around June 1 and continues into early winter; fish from 2 to 35 pounds make up the catch.

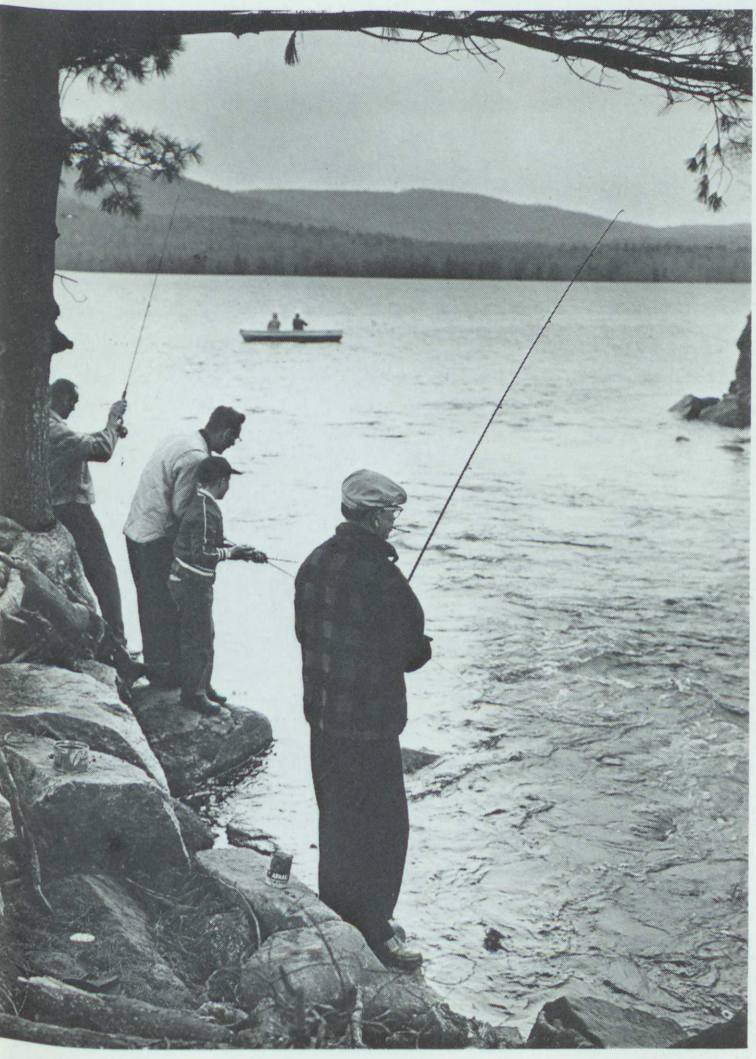
Popular fishing areas are at the reversing falls and Westport Island on the Sheepscot River; Damariscotta River; New Meadows River; St. George River; and the Passagassawakeag River. All the tributaries of the Kennebec up to Augusta are good, and during May and June, the mouth of Cobbosseecontee Stream is a hot spot, particularly at night.

The salt-water version of the smelt is pursued on its spring spawning runs but it is the ice fishing for this critter that is most popular and another traditional Maine pastime. Colonies of smelting shacks spring up on the tidal estuaries and rivers as soon as ice conditions are safe, and the old wood-stoves hardly cool off until spring. It's every bit as much family sport as it is a night out with the boys.

Most of the smelt fishing in this area is done on the tributaries of Merrymeeting Bay on the Kennebec River; Marsh River; St. George River; Medomak River; and the New Meadows River.

Ice fishing. Fresh-water ice fishing is becoming more popular in Maine. The development of the snowmobile, ice auger, and motorized ice auger have taken a lot of the work out of the sport.

The season on pickerel, perch, and smelt begins on many ponds at ice formation; and on those waters where ice fishing is permitted, salmon, togue, and trout can be taken during February and March. We now have an ice fishing season on bass — it coincides with the salmon and trout season. All ice fishing ends the last of March. You should consult the ice fishing regulations booklet before trying your luck.



The spring white perch runs draw a lot of anglers to such places as the inlet of Long Pond in Belgrade Village.

Stream fishing. Big river fishing for trout is pretty scarce in the Belgrade Region. Our streams get quite warm, and most of them are flat or dammed with extensive deadwater areas supporting large populations of competitor fish. Trout populations exist in many of the smaller streams with suitable habitat, but they are usually confined to localized areas, especially during warm weather. A notable exception is the upper reaches of the Sheepscot River which has attractive natural brown trout and brook trout populations.

There are some really excellent streams for bass and pickerel fishing from a canoe or boat. Cobbosseecontee Stream is foremost with both smallmouth and largemouths; largemouths dominate, with fish up to eight pounds reported every year.

Belgrade Stream is good for largemouths, and, although the river has been despoiled by pollution, some stretches of the Sebasticook River are still good for smallmouths.

Brook fishing for brook trout has to be hunted for, but it does exist for the patient and dedicated alder-runner. Rather than call undue attention to these small waters, we will leave it to the initiative of the individual fisherman to ferret out his own undercut banks and foam-flecked pools.

Canoeing. This section of the state is not well endowed with the long stretches of riffles and mild rapids which delight confirmed canoeists. Much of the terrain is flat, and the coastal drainages are quite small.

The Androscoggin and Kennebec have stretches of deadwater canoeing with portages around the big dams; but these fine rivers are badly polluted, and the trip is most enjoyable if you look at the sky rather than the water.

The Sebasticook River in the Burnham-Winslow area is quite good although there is a pollution situation here, too. Twenty-Five Mile Stream is a pleasant trip, and on the right pitch of water, several of the smaller streams may prove interesting.

Deadwater stream and lake trips are possible on the Belgrade chain and the Cobbosseecontee drainage. These lakes are big, and the trips can be broken up into segments to suit your inclination and ability.

On the subject of canoe trips, we would recommend that you do your homework thoroughly. Choosing a stream is important, but in some cases the expected flow is most critical.

AFTER THAT flying trip through the Belgrade region, you may be more confused than informed. But the variety of species and lake types should be obvious. The recommended waters, at least those for bass, pickerel, and perch, are far from a complete listing of all the good waters; and, fishing being what it is, we don't guarantee results on those we have suggested.

In planning your trip to *any* Maine waters, we would suggest you do a little research with the following references:

1. Open water and ice fishing law book.
2. Index of lake surveys.
3. Appropriate U.S.G.S. topographic maps.

The first two are available at no cost from the Maine Department of Inland Fisheries and Game, State Office Building, Augusta, Maine 04330. The U.S.G.S. maps are available at local sporting goods stores or from U.S. Geological Survey, Washington, D.C.

The law books will let you be certain just when each pond is open or closed to fishing for various species, as the Maine laws do contain quite a few exceptions to any general laws.

The lake survey index lists our lakes and ponds by counties and indicates which fish species predominate. You may then order individual lake surveys concerning waters which interest you. These surveys cost 10 cents each and include a depth map, species list, and general biological description and management policy for the lake.

The timing of your trip may be all important if you seek a particular fish. Salmon, togue, and trout fishing is best from ice-out until late June. Most reclaimed brook trout ponds open late in April. The early bass season is in June, and all the warm-water fish are taken readily throughout the summer months. Stripers come in at the end of May. Ice fishing for pickerel and perch begins on most ponds at freeze-up. Anadromous smelt fishing begins soon after inland freeze-up; and on February 1 most salmon, togue, and brown trout waters open.

For more detailed information on any water, contact a fishery biologist, or local game warden. A little advanced scouting will make your time in the field more productive and enjoyable. It takes more than one trip to become familiar with the quirks of any lake. Variety and a change of scene are great, but sometimes time is better invested by concentrating on a water with known potential and learning some of its pecularities.

Accommodations shouldn't be any problem. There are commercial camps on many lakes, and the road system is such that no water is far from lodgings. Private camping areas are common, and overnight camping is available at state parks at St. George Lake (which opens on May 1) and Camden Hills (opening on May 15); these parks remain open for camping until October 15.

Boat landings are generally good. Any boat up to 14-16 feet which two men can manhandle a little when necessary can be used without any trouble. A good, seaworthy, 14-foot boat is adequate on any Belgrade Region water.

THE Belgrade Region is obviously not one of predominately wilderness but of numerous communities and cities, considerable population, and varied industry and agriculture. Our many beautiful lakes, ponds, and waterways have a long history of intense use, and these resources are under more pressure every day. In some cases, use has meant abuse, and our major problem in fisheries management today is that of restoring and preserving habitat so that we will have water-based recreation in the future. ■

The picturesque Sheepscot River has good fishing for several species including brook trout, brown trout, Atlantic salmon, and striped bass.

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